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(71) Applicant(s)
Bayerische Motoren Werke AG
(Incorporated in the Federal Republic of Germany)
Petuelring 130, BMW Haus, D-800 München 40,
Federal Republic of Germany

(72) Inventor(s)
Mark Antony Palmer

(74) Agent and/or Address for Service
Bromhead & Co
150 Regent Street, LONDON, W1R 5FA,
United Kingdom

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EP 0940288 A **US 5269581 A**
WPI Abstract: Acc. No. 1998-266357 & JP 10-086721
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(58) Field of Search
UK CL (Edition R) A4L LBPB LBPC LBPE LBPG LBPT ,
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Online: EPODOC, WPI, JAPIO

(54) Abstract Title
Seating assembly

(57) A storage structure for a collapsible seat is disclosed comprising a seat assembly, a floor 2 having a storage recess 4, and a linkage assembly between the seat assembly and the recess. The seat assembly has a seat 10 and a squab 12. The seat 10 is connected to the recess 4 by the linkage assembly. The seat assembly is moveable between a stored position in which a rear surface 20 of the squab 12 is substantially flush with the floor 2 surrounding the recess 4 and a deployed position in which the rear surface 20 of the squab is inclined at an angle to the floor surrounding the recess.

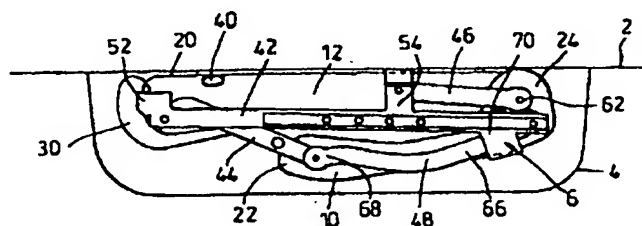


Fig. 1

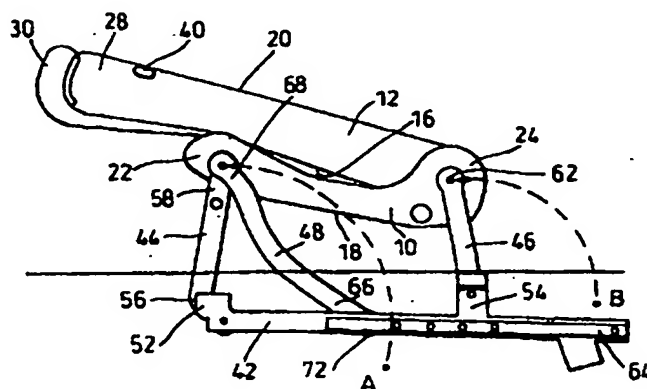


Fig. 2

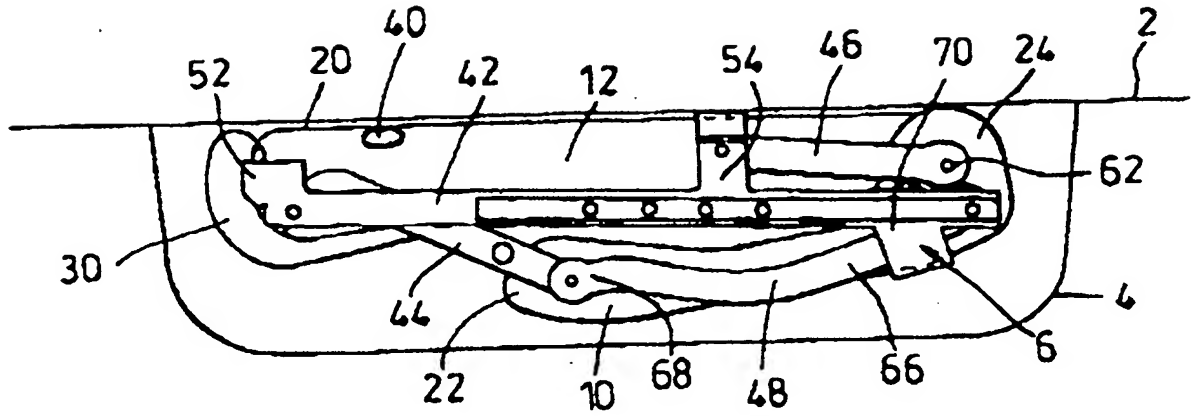


Fig. 1

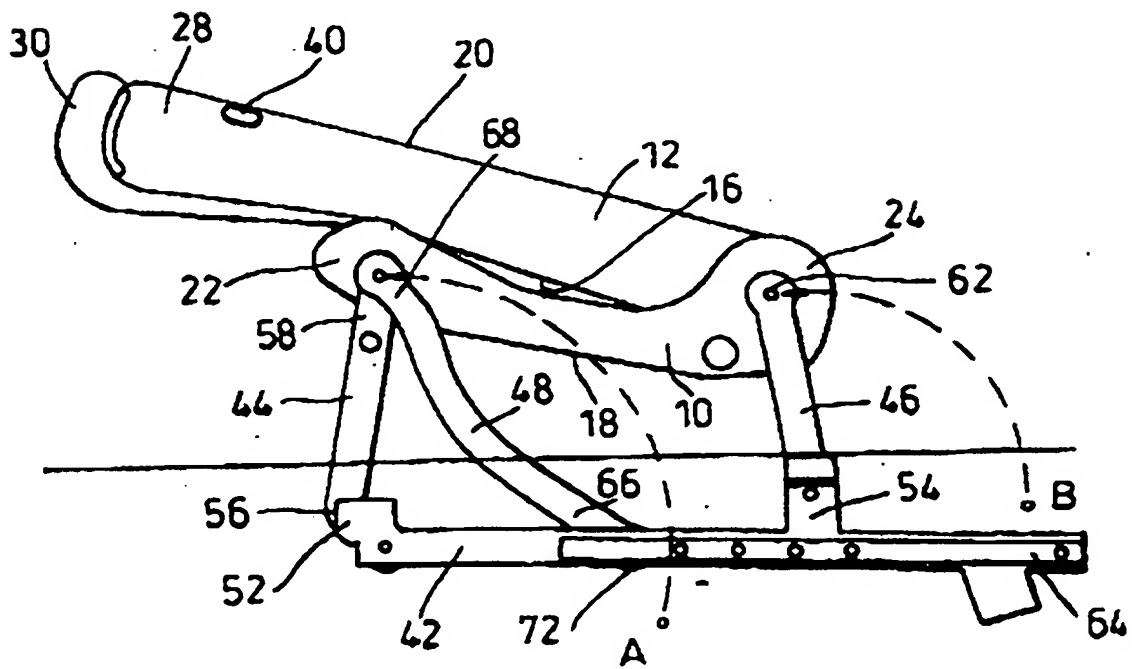


Fig. 2

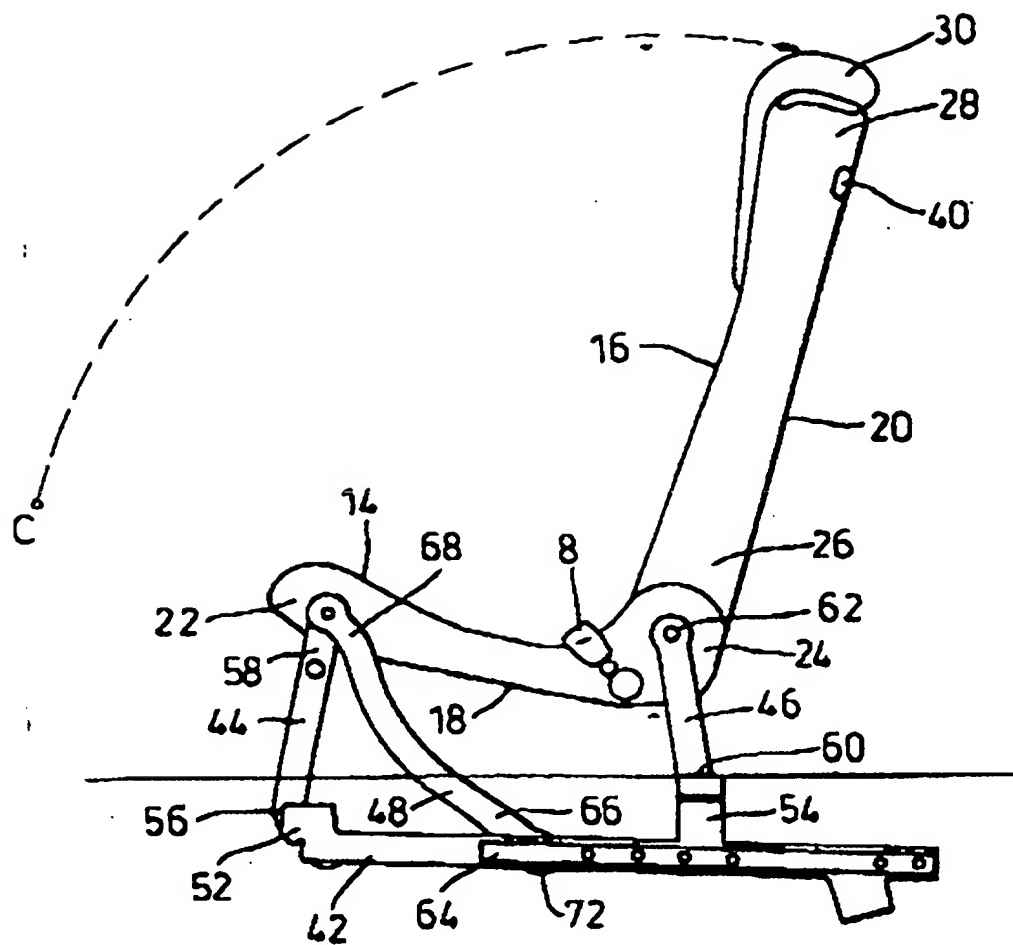


Fig. 3

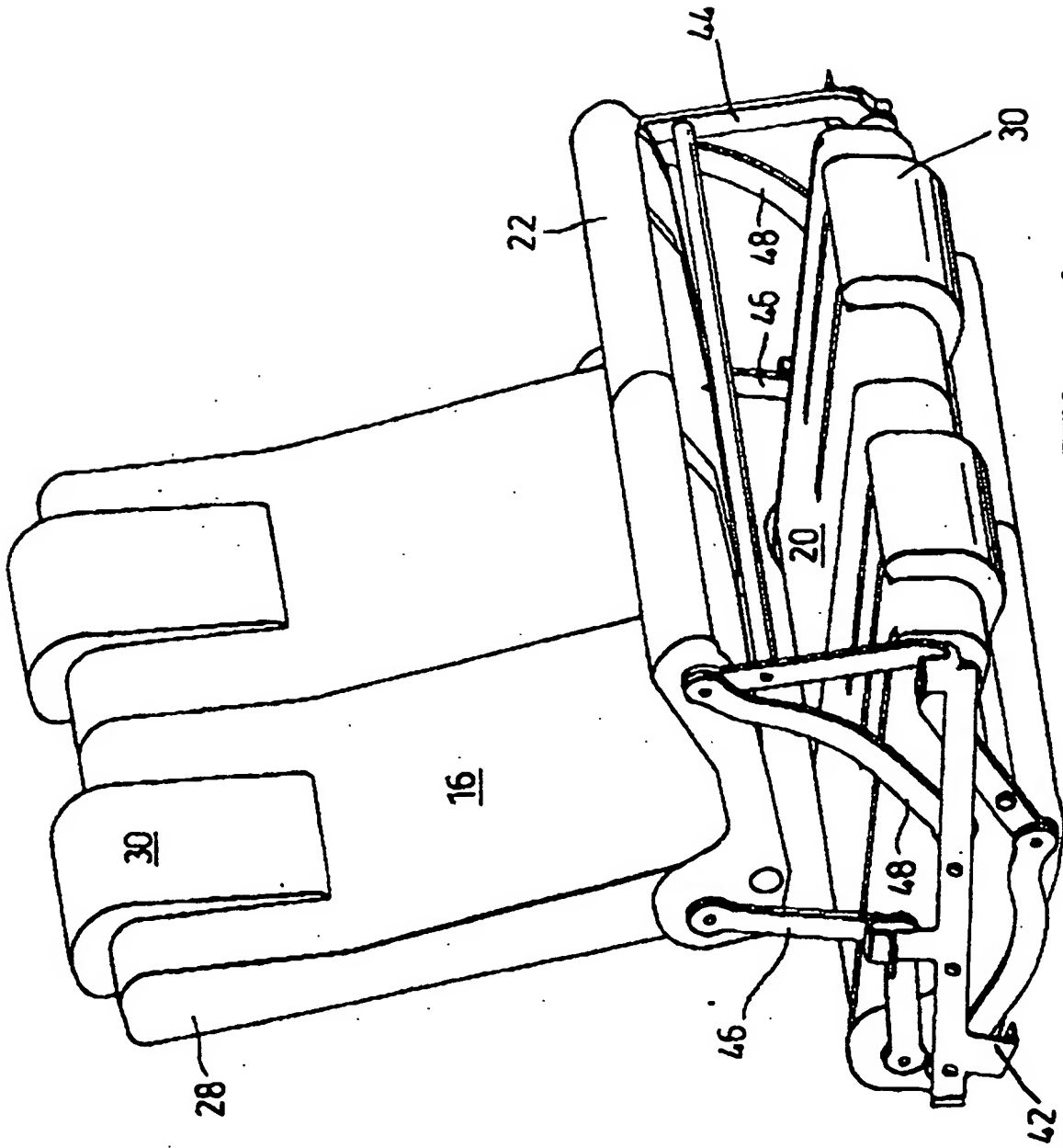


Fig. 4

Seating Assembly

The present invention relates to a seating assembly, and in particular, but not exclusively to a motor vehicle seat assembly of the kind commonly referred to as third row seating.

It is known to provide additional seating in a motor vehicle to provide a third row of passenger seating. It will be understood that load space within a vehicle is highly desirable and with vehicle fitted with such third row seating load space is at a premium. In order that
5 such third row seating does not occupy such valuable load space within the motor vehicle when not in use it is known to make such third row seating removable. However, removal, storage and subsequent reinstallation of such seating is at best inconvenient to a user of the motor vehicle.

10 It has also been proposed to make such third row seating collapsible such that while always present within a vehicle the available load space can be improved by manipulation of the seating. However, in some cases, it is known for the third row seating still to project from the load space of a vehicle reducing the load space available for use in comparison with a motor vehicle not fitted with such third row seating.

15 It is known to provide third row seating that can be stored within a recess such that when in a stored position, the third row seating does not extend into the load space of a motor vehicle. The seat assembly comprises a seat and a squab. The seat is hingedly connected at a rear top surface to a squab, and pivotally connected at a rear lower surface to an upper region of a recess provided in a floor of a load space of a motor vehicle. From a stored position, the
20 seat is rotated about a pivot, and the squab hinged away from the seat to present a deployed seat assembly. The seat is stored by returning the squab adjacent the seat and rotating the seat back around the pivot.

This construction has a number of limitations. Since the recess is sized to store the squab beneath the seat, the seat and squab are of similar dimensions. This may result in a

squab of lower height than is comfortable for a passenger using such third row seating. If the squab and recess are enlarged, an undesirable channel is formed behind the seat in the load space when the seat is stored. In addition, it is desirable to provide some spacing between the front of the seat and the vehicle floor to accommodate a lower leg region of the passenger. In
5 this construction while a support leg may be deployed from the front of the seat to raise the front of the seat from the floor of the load space, this also has the effect of tripping the seat assembly slightly backwards.

Other structures are known. It is a disadvantage of many third row seating arrangements that access to the seating is required to the seating from a rear of the load space
10 in order to deploy and/or store the seating. This requires opening of a rear tailgate. This in turn requires sufficient clearance to the rear of the vehicle to allow the tailgate to be opened. This is not always possible.

According to a first aspect of the present invention, a storage structure for a collapsible seat comprises a seat assembly, a floor having a storage recess, and a linkage assembly
15 between the seat assembly and the recess, the seat assembly having a seat and a squab, is characterised in that the seat is connected to the recess by the linkage assembly such that the seat assembly is moveable between a stored position in which the seat is retained in a plane within the recess and a deployed position in which the seat is vertically spaced from the recess in a plane substantially parallel thereto, and in that the squab is independently pivotable
20 between a first position and a second position with respect to the seat.

Preferably, in the stored position a rear of the squab is substantially flush with the floor surrounding the recess and in the deployed position the rear of the squab is at an angle to the floor surrounding the recess.

This has as an advantage that when the seat assembly is in the stored position, it does not intrude into a load space of a motor vehicle incorporating the seat assembly and the associated storage structure.

Preferably, locking means are provided to retain the seat assembly in either the stored
5 condition or the deployed condition. More preferably, release means are provided for in an upper region of the squab to release the locking means. Even more preferably, the release means comprises a handle located in a shoulder region of the squab.

The invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

10 Figure 1 shows a schematic side view of a storage structure for a collapsible seat in accordance with the present invention in a stored position;

Figure 2 shows a schematic side view of the storage structure of Figure 1 in an intermediate position between the stored position and a deployed position;

Figure 3 shows a schematic side view of the storage structure of Figure 1 in the
15 deployed position; and

Figure 4 shows an isometric view of a storage structure for a collapsible seat in accordance with the present invention in both a deployed position and a stored position.

Referring first to Figure 1, a collapsible seat is shown in a stored within a recess 4. The recess 4 is formed in a floor panel 2 of a load space of a motor vehicle. The recess 4 is
20 conveniently formed in that part of the floor panel located between the longitudinally directed load bearing members of the motor vehicle body-in-white, often referred to as the vehicle longitudinals. In some vehicles it may be necessary also to take account of a tunnel formed with and extending beneath the floor panel accommodating a transmission mechanism.

The collapsible seat comprises a seat assembly and a linkage assembly. The linkage assembly is disposed between the seat assembly and the recess 4 to connect the seat assembly and the recess together.

5 The seat assembly comprises a seat 10 and a squab 12. The seat and the squab have substantially planar surfaces on which in use a user is designed to be seated. These are referred to herein as the seating surfaces 14,16 of the seat and the squab. The obverse sides of the seat and squab to the seating surfaces are referred to as the rear surfaces 18,20 of the seat and the squab.

10 The seat has a first end 22 and a second end 24. The squab has a first lower region 26 and a second upper region 28. The first lower region of the squab 12 is pivotally connected to the first end 22 of the seat 10, to allow the squab to be independently pivotable between a first position and a second position with respect to the seat. Conveniently, the squab and the seat may be releasably latched relative to each other in either a stored position (Figure 1) and a deployed position (Figure 3). Adjustment means (not shown) may also be provided to
15 adjust the relative position of the squab and the seat in the deployed position.

In the stored position, the seating surfaces 14,16 of the seat and the squab are disposed substantially opposite and adjacent to one another. In the deployed position, as would be expected, the seating surfaces are spaced from one another to allow a vehicle occupant to be seated. In other words, in the stored position the squab is located in a plane substantially
20 parallel to that containing the seat and in the deployed position the squab is located in a plane inclined to that containing the seat.

The second upper region 28 of the squab 12 may comprise a headrest 30 or similar portion. The headrest 30 may conveniently be adapted to telescopically extend from the upper region 28 of the squab 12.

It can be seen in this stored position that the recess 4 is of a depth such that the rear surface 20 of the squab 12 is substantially flush with the floor panel 2 in which the recess 4 is formed. The rear surface 18 of the squab is conveniently made of steel or other similar material in order that loads stored in the load space while the seat assembly is in the stored position do not cause damage to the squab 12 or other parts of the seat assembly. The length and breadth of the recess 4 are so shaped and sized so as to fit the height and breadth of the squab 12.

Since the length and breadth of the recess 4 are sized to fit the squab, the size of the opening is limited only by the size of the floor of the load space available. A lower portion of the recess may be contoured to allow for any difference in size between the seat 10 and the squab 12. Alternatively, the recess 4 may be generally box shaped to create a covered storage space between the second end 24 of the seat 10, an upper region of the seating surface 16 of the squab 12 and the recess 4.

Conveniently, a seat belt retainer 8 may be provided may be provided on a side face of the seat 10 at the first end 22 of the seat. This has the advantage that when the seating assembly is in the stored position, the seat belt retainer 8 does not extend into the load space of the motor vehicle.

A seat belt deployment mechanism (not shown) may be provided on an opposite edge of the seating assembly to the seat belt retainer on the first end of the seat, the lower region of the squab or the upper region of the squab. Alternatively, the seat belt deployment mechanism may be provided at an associated portion of the load space of the vehicle.

The linkage assembly comprises at least two parallel linkages 6. In the case of a seat for a single person, two linkages may be used, one to each side of the seating assembly. In the case of a bench type seating assembly a further linkage or linkages may be provided between the side linkages. In the illustrated embodiments, only the side linkages are shown. Since

the linkages operate in tandem and are substantially identical, only one linkage 6 will be described. In describing operation of the structure, unless the context indicates otherwise, reference to more than one linkage will be implicit.

Each linkage 6 comprises a tie bar 42, a first tie member 44, a second tie member 46,
5 and a sliding support member 48. The tie bar 42 is secured to the recess 4 in the floor panel of the motor vehicle load space. The tie bar may be secured by any suitable means such as welding or other fastening means securing flanges provided on the tie bar 42 to the floor panel 2 of which the recess 4 forms a part.

The first tie member 44 is pivotally connected at a first end 56 to a front end 52 of the
10 tie bar 42. The first tie member 44 is pivotally connected at a second end 58 to one side of the second end 24 of the seat 10.

The second tie member 46 is pivotally connected at a first end 60 to a portion 54 of the tie bar which in the deployed position is substantially below the first end 22 of the seat 10. The second tie member 46 is pivotally connected at a second end 62 to the one side of the
15 first end 22 of the seat 10.

The sliding support member 48 is releasably retained at a first end 66 for movement along a track 64 associated with the tie bar 42. In the stored position, the first end 66 of the sliding support member 48 is releasably retained at a first end 70 of the track 64. In the deployed position, the first end 66 of the sliding support member 48 is releasably retained at a
20 second part 72 of the track 64 .

This may conveniently be achieved by providing a trigger latch (not shown) for the sliding support member 48. Actuation of the trigger latch is conveniently by way of a handle 40 provided at an upper region of the squab 12. By varying the location of the second part 72 of the track, the height of the seat 10 can be adjusted in a manner to be described.

The sliding support member 48 is pivotally connected at a second end 68 to the second end 58 of the first tie member 44 at the second end 22 of the seat. Preferably, the sliding support member 48, the first tie member and the seat are connected by way of a common pivot or spigot.

5 The deployment of the seating assembly from the stored position will now be described. The handle 40 on the side of the upper portion of the squab 12 is operated to actuate the trigger latch to release the first end 66 of the sliding support member from the first end 70 of the track. The first and second tie members 44,46 are then free to rotate about their respective first ends 56,60 in the directions indicated by arrows A and B (Figure 2). This
10 raises the seat 10 in a substantially parallel manner from the stored position to a deployed position. Once the desired height has been obtained, the handle 40 is operated to actuate the trigger latch to retain the first end 66 of the sliding support member at the second part 72 of the track. For example, the handle 40 can be pulled to release the trigger latch and released to reset the trigger latch.

15 In this position, the seating surfaces 14,16 of the seat and the squab are still disposed substantially opposite and adjacent to one another since the squab is maintained in a plane substantially parallel to that containing the seat.

With the seat 10 in the deployed position, the latch between the seat and the squab is released by any suitable means and the squab 12 moved relatively backwards and upwards in
20 the direction of arrow C to place the squab 12 in the deployed position (Figure 3), i.e. the squab moved to a plane inclined to that containing the seat.

The seat assembly may be returned to the stored position from the deployed position by reversing the operations described above.

In use deploying the seat assembly from the stored position to the deployed position requires relatively opposing movement of the two operations; raising the seat 10 and raising the squab 12. In the illustrated embodiment, the seat 10 is raised by an anti clockwise motion of the seat, and raising of the squab 12 requires a clockwise motion. Conversely, returning
5 the seat assembly from the deployed position to the stored position requires anti clockwise motion of the squab 12 and anti clockwise motion of the seat 10.

Accordingly raising of the squab 12 will not lead inadvertently to further raising of the seat 10.

It will be appreciated that the seat assembly and linkage can be operated prior to
10 installation in a motor vehicle, thereby eliminating any that operate incorrectly. Further in assembly of the motor vehicle, the only time involved to fit the seat and associated linkage is the time taken to fit the tie bar to the recess.

It will also be understood that with the second end of the seat 10 being directed to a front end of the motor vehicle, the seating assembly can be deployed and/or stored relatively
15 easily from in front of the seating assembly by a user. The user pulls the seat 10 up into position using the handle 40, and raises the squab 12 by lifting up and then pushing the squab into position. Accordingly access from the rear portion of the motor vehicle is not required for a seat assembly as described fitted in this manner.

CLAIMS

1. A storage structure for a collapsible seat comprises a seat assembly, a floor having a storage recess, and a linkage assembly between the seat assembly and the recess, the seat assembly having a seat and a squab, is characterised in that the seat is connected to the recess by the linkage assembly such that the seat assembly is moveable between a stored position in which the seat is retained in a plane within the recess and a deployed position in which the seat is vertically spaced from the recess in a plane substantially parallel thereto, and in that the squab is independently pivotable between a first position and a second position with respect to the seat.
2. A storage structure according to claim 1, characterised in that in the first position the squab is located in a plane substantially parallel to that containing the seat and in the second position the squab is located in a plane inclined to that containing the seat.
3. A storage structure according to claim 1, characterised in that in the first position a seating portion of the squab is adjacent to a seating surface of the seat and in the second position the seating portion of the squab is spaced from the seating surface of the seat.
4. A storage structure according to any previous claim, characterised in that in the stored position a rear of the squab is substantially flush with the floor surrounding the recess and in the deployed position the rear of the squab is at an angle to the floor surrounding the recess.
5. A storage structure according to any previous claim, characterised in that locking means are provided to retain the seat assembly in either the stored condition or the deployed condition.
6. A storage structure according to claim 5, characterised in that release means are provided for in an upper region of the squab to release the locking means.

- 7 A storage structure according to claim 6, characterised in that the release means comprises a handle located in a shoulder region of the squab.
- 8 A storage structure according to any previous claim, characterised in that the linkage assembly comprises at least two linkages, at least one linkage of said at least two linkages comprising a tie bar, a first tie member, a second tie member and a sliding support member.
- 9 A storage structure according to claim 8, characterised in that the first tie member is pivotally connected at a first end to a front end of the tie bar, the first tie member is pivotally connected at a second end to one side of the second end of the seat, the second tie member is pivotally connected at a first end to a portion of the tie bar which in the deployed position is substantially below the first end of the seat and the second tie member is pivotally connected at a second end to the one side of the first end of the seat.
- 10 A storage structure for a collapsible seat substantially as described herein with reference to and as illustrated in the accompanying drawings.
- 11 A collapsible seat comprising a seat assembly and a linkage assembly substantially as described herein with reference to and as illustrated in the accompanying drawings.
- 12 A motor vehicle incorporating a storage structure according to any previous claim.



Application No: GB 9920140.2
Claims searched: All

Examiner: Richard Gregson
Date of search: 25 January 2000

Patents Act 1977 Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:
UK Cl (Ed.R): A4L LBPB, LBPC, LBPE, LBPG, LBPT; B7B BHD, BEA, BEC
Int Cl (Ed.7): B60N 2/00, 2/04, 2/30, 2/36.
Other: Online: EPODOC, WPI, JAPIO.

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
A	EP 0940288 A (MAZDA) - see whole document	1-4
A	US 5269581 A (HONDA) - see whole document	1-4
X	WPI Abstract. Acc. No.1998-266357 & JP10-086721 (SPRING) - see whole document	1-4
X	PAJ Abstract. JP 6-219198 (MAZDA) - see whole document	1-4
X	PAJ Abstract JP 3-200444 (SUZUKI) - see whole document	1-5

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

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Date Lodged 01.10.1998

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(32) 13.12.1994

(33) GB

(31) 9511139

(32) 02.06.1995

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(51) INT CL⁶

B60N 2/34 , A47C 1/035 , B64D 11/06

(52) UK CL (Edition Q)

A4L LBLA LBMB L106 L109 L144

U1S S1839

(56) Documents Cited

None

(58) Field of Search

UK CL (Edition P) A4L LBBA LBLA LBMB

INT CL⁶ A47C , B60N 2/34 , B64D 11/06

NONE

(71) Applicant(s)

British Airways Plc

(Incorporated in the United Kingdom)

PO Box 365, Waterside, HARMONDSWORTH,

West Drayton, UB7 0GB, United Kingdom

(74) Agent and/or Address for Service

R G C Jenkins & Co

26 Caxton Street, LONDON, SW1H 0RJ,

United Kingdom

(72) Inventor(s)

Ian Dryburgh

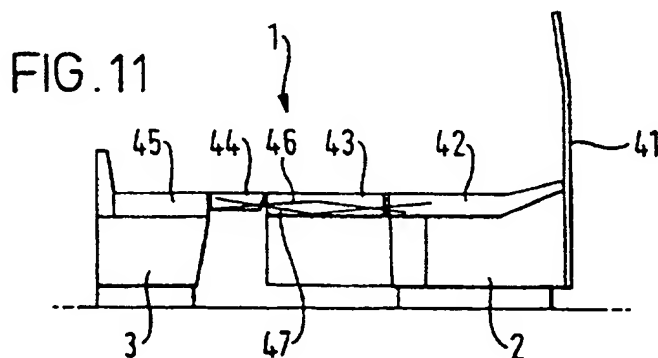
Simon Lunn

Russell Mulchansingh

(54) Abstract Title

A seating unit for an aircraft

(57) A seating unit for a aircraft cabin comprises a secondary seat 3 positioned to face a primary seat 2, the secondary seat having a seating portion 45 positioned to cooperate with the leg-rest 44 of the primary seat to form a continuous flat sleeping surface when the back of the primary seat is reclined to the horizontal position.



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FIG. 1

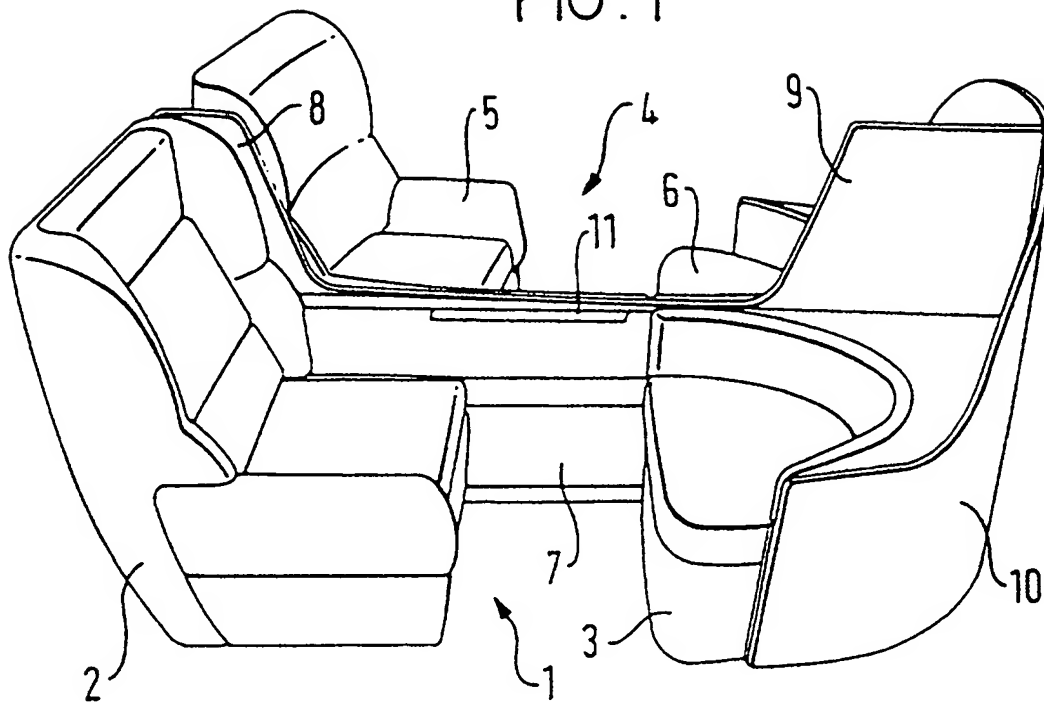


FIG. 2

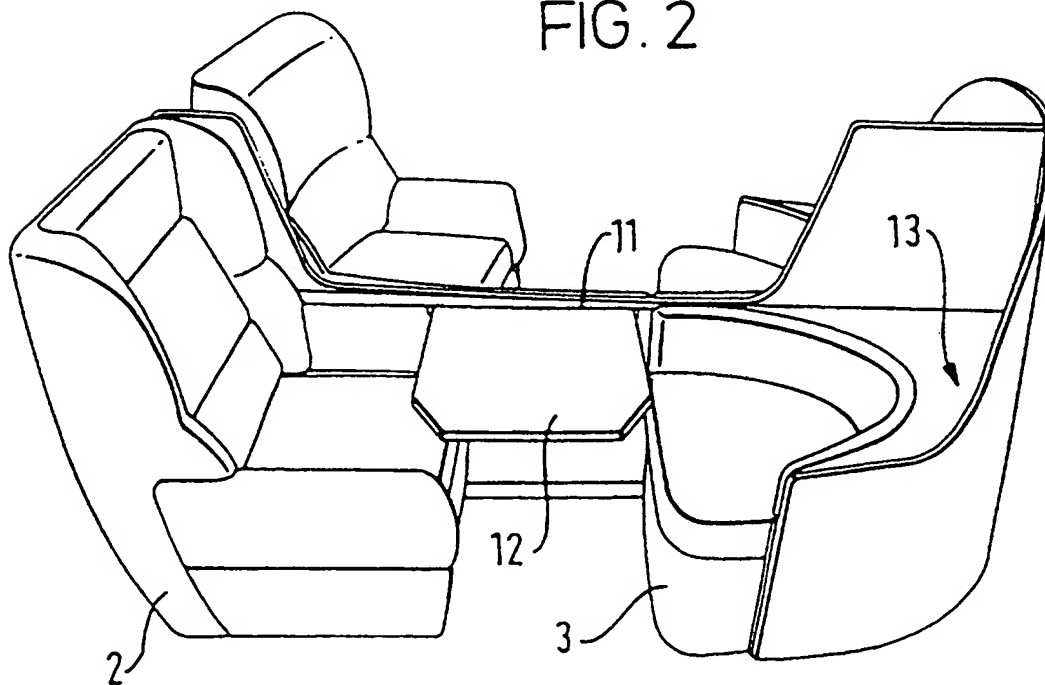


FIG. 3

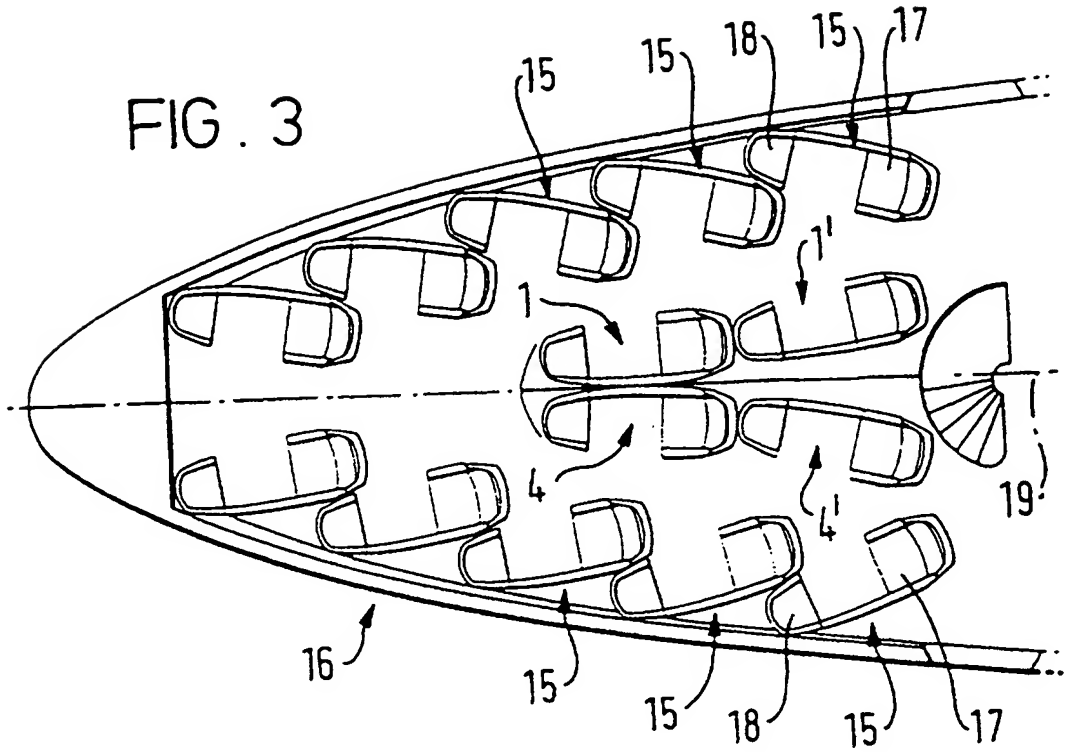


FIG. 4

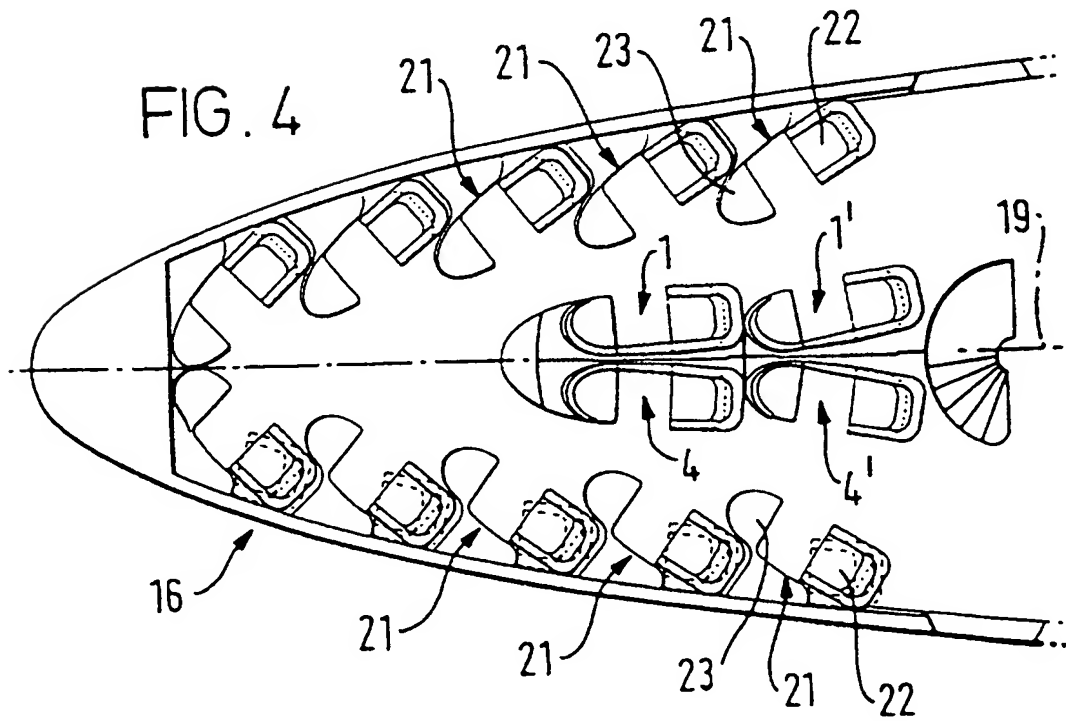


FIG. 5

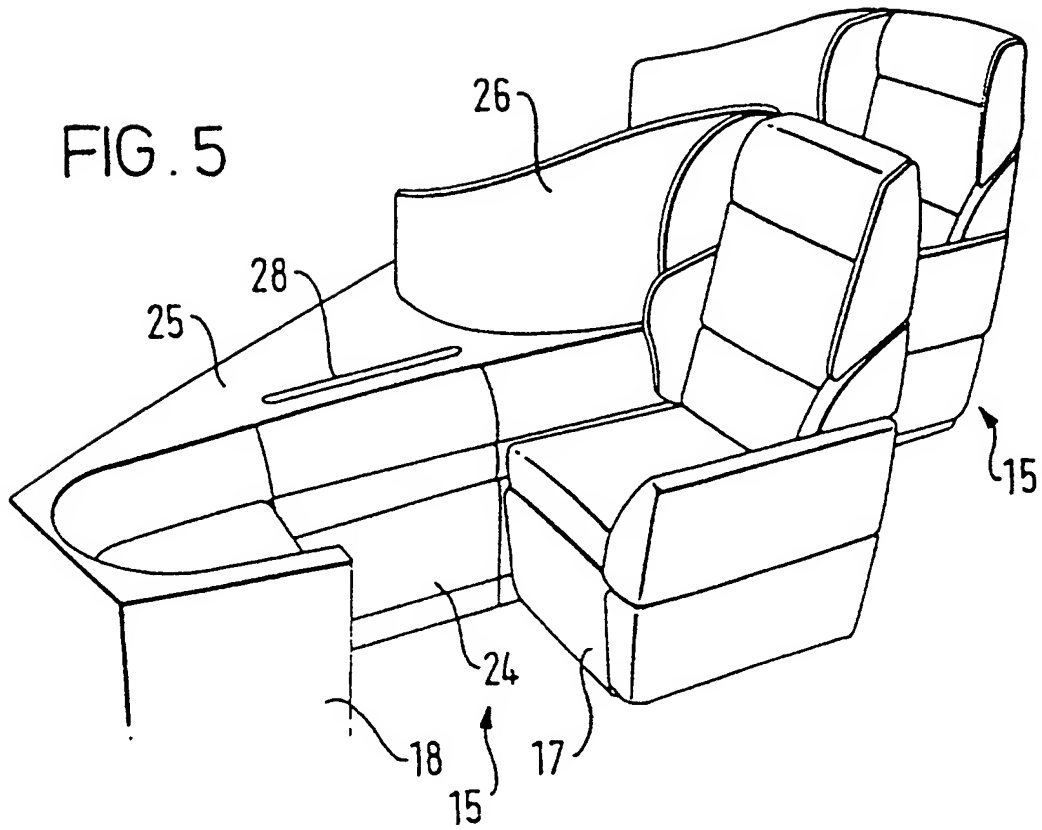
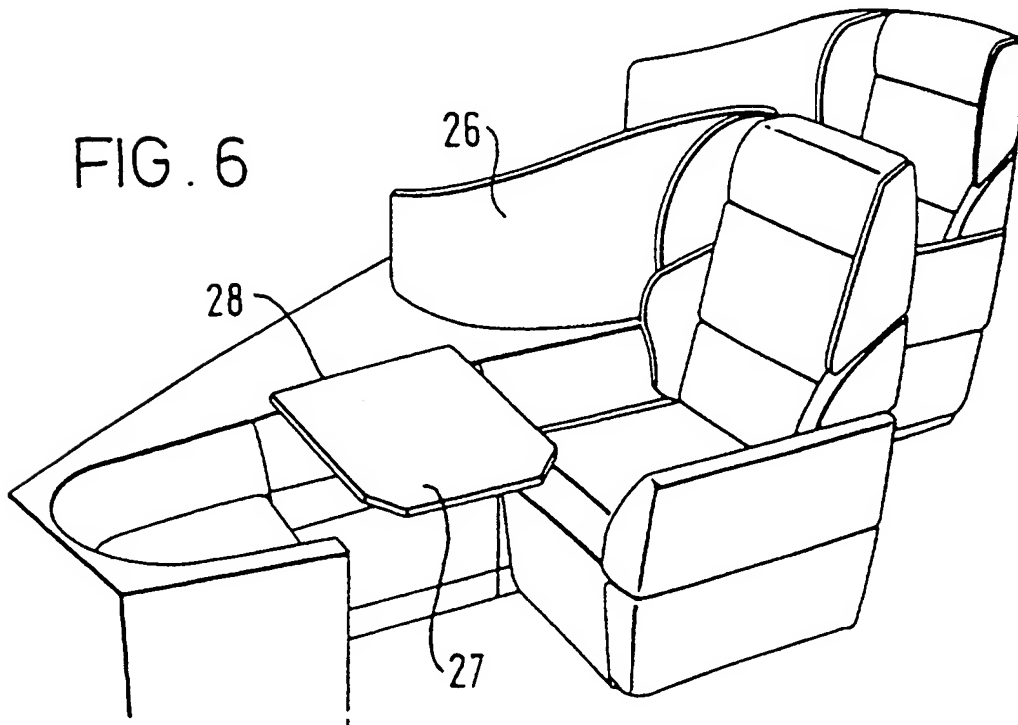


FIG. 6



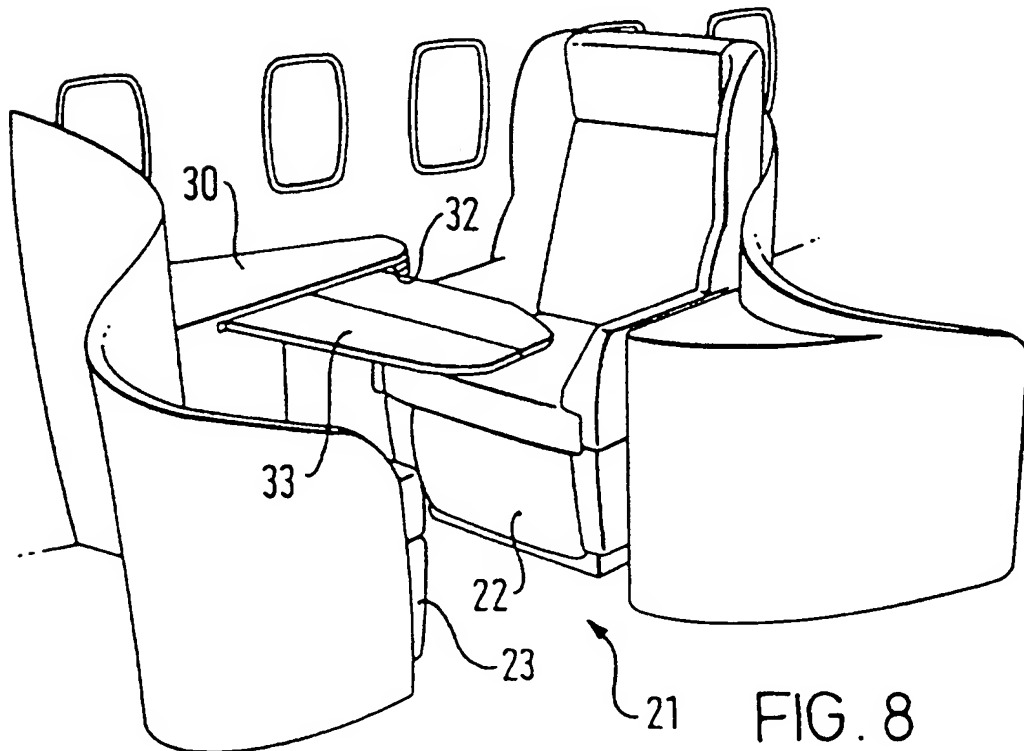
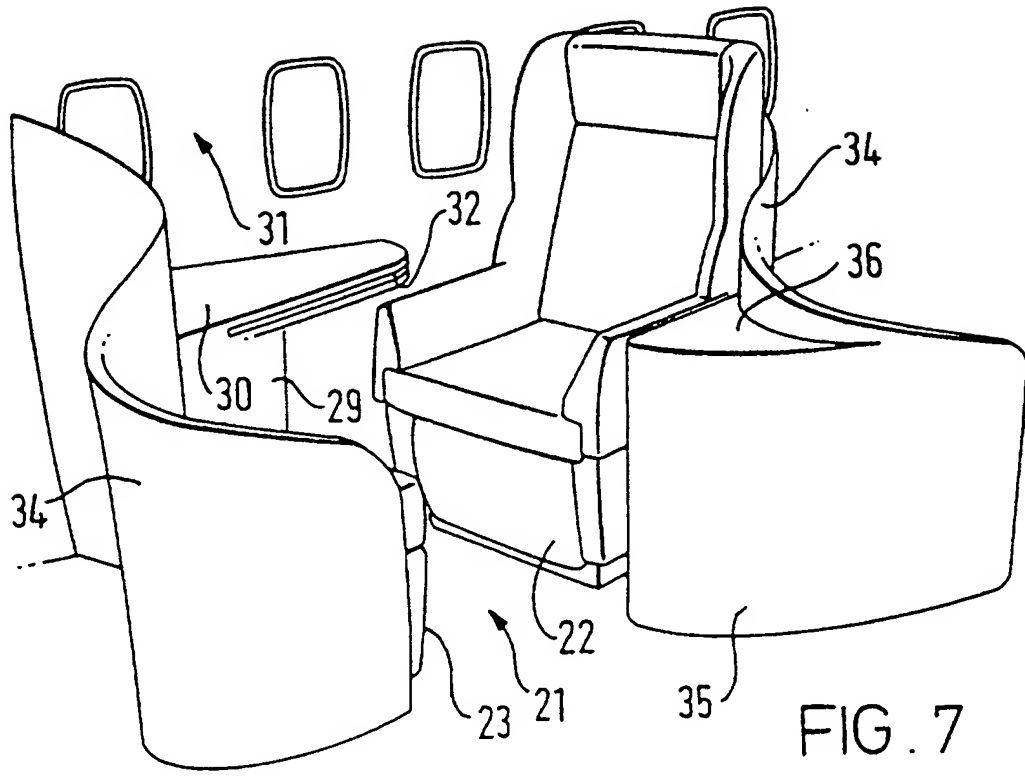


FIG. 9

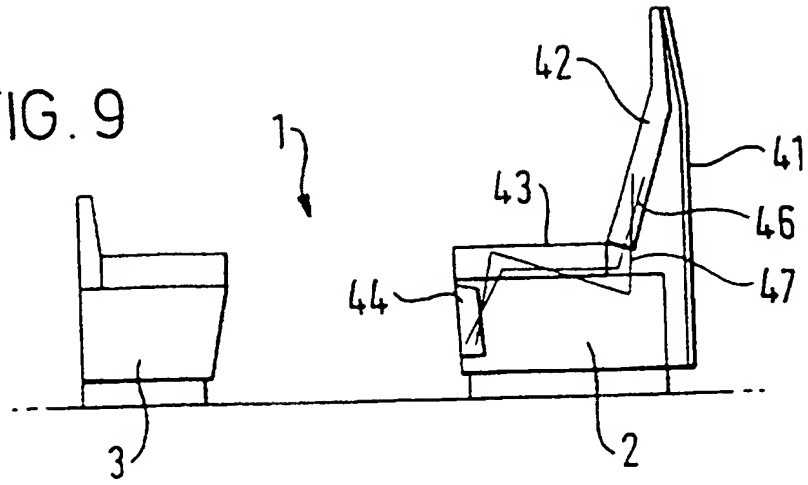


FIG. 10

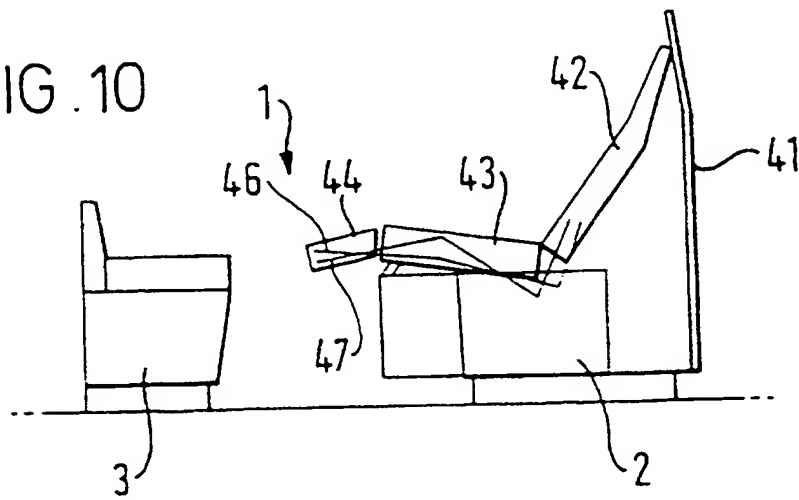


FIG. 11

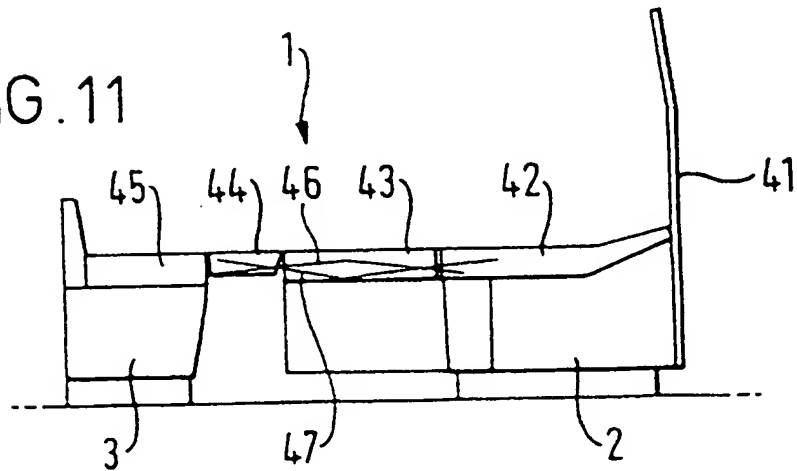


FIG. 12

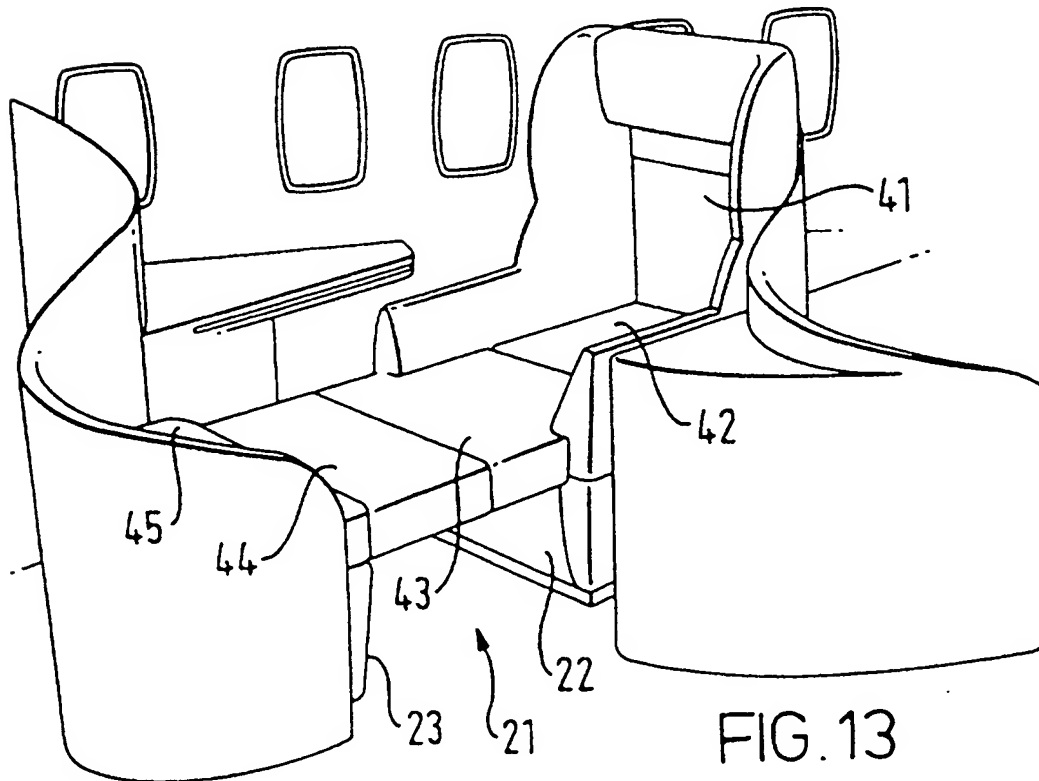
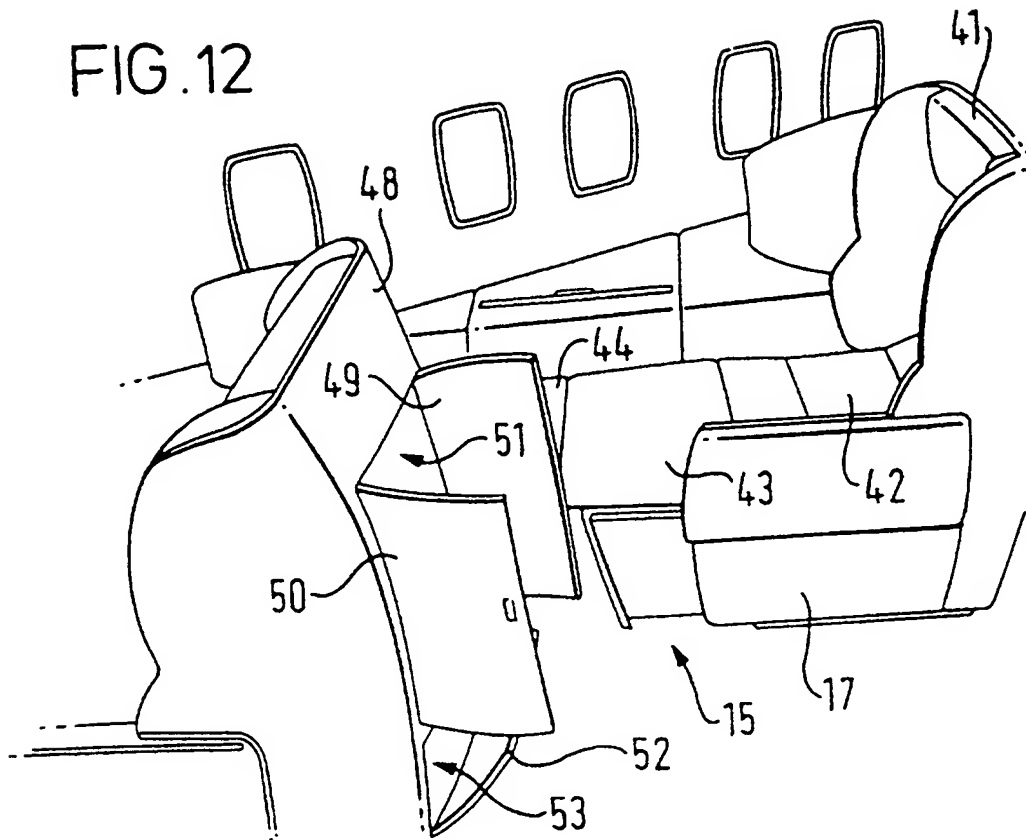


FIG. 13

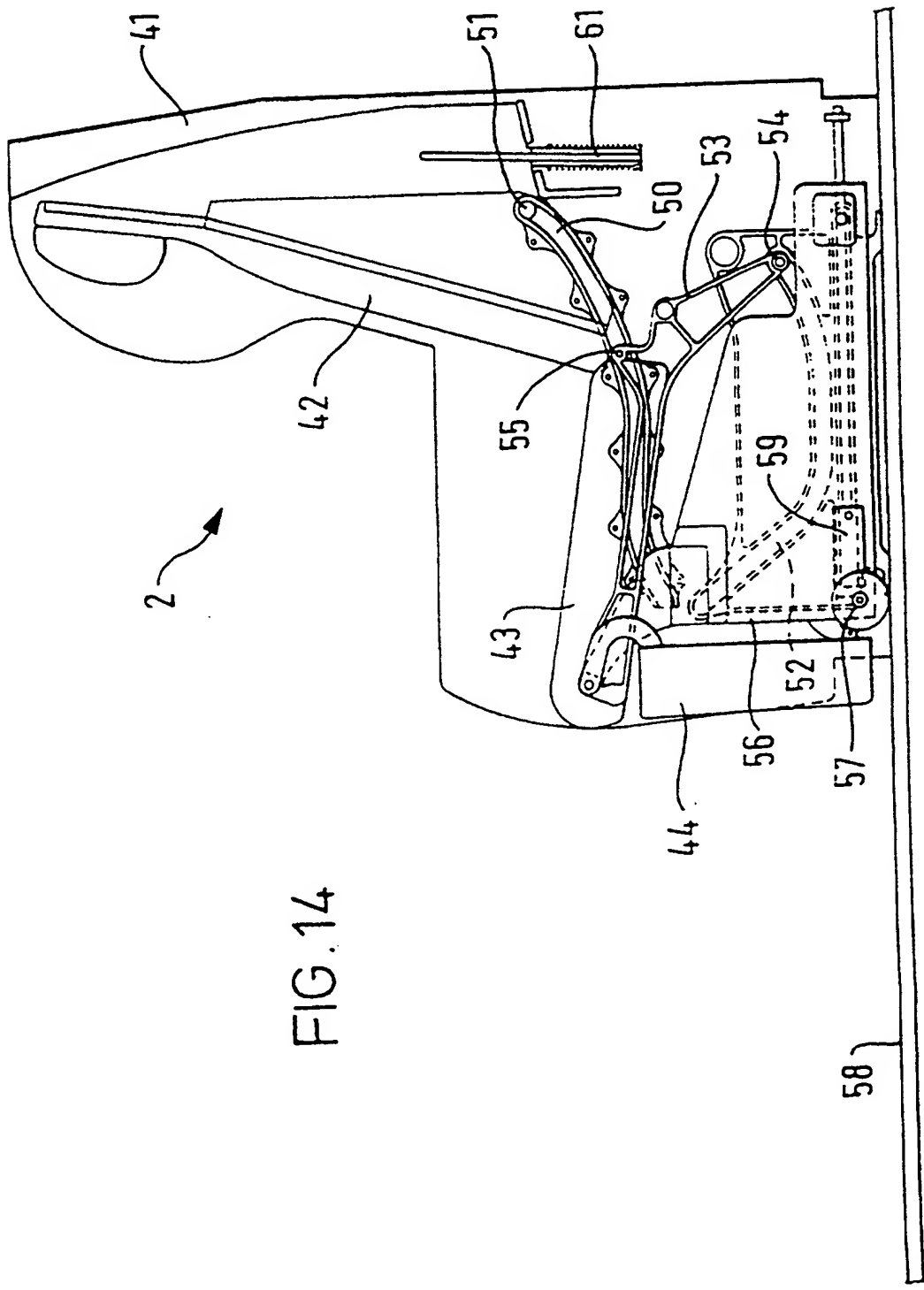


FIG. 14

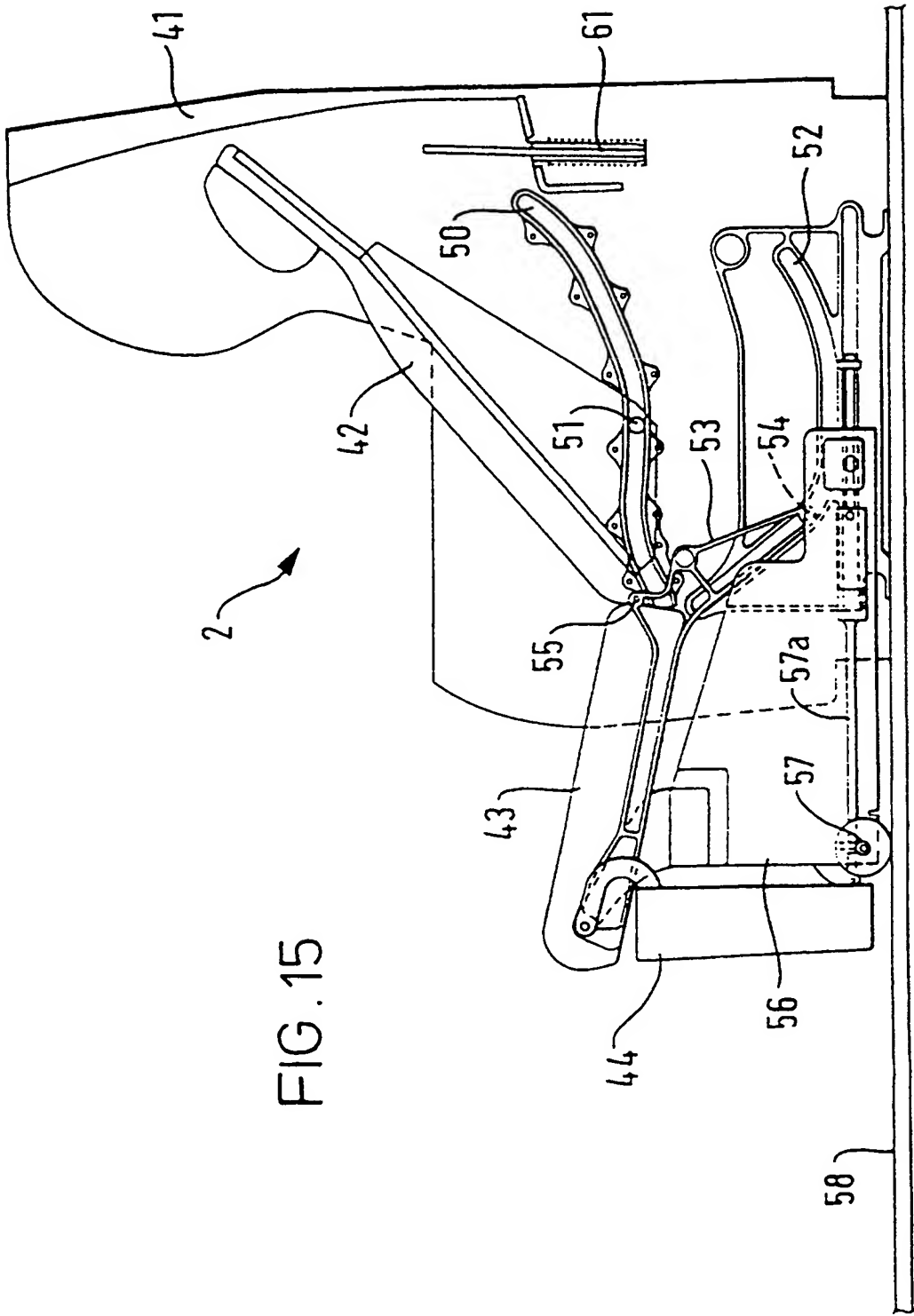


FIG. 15

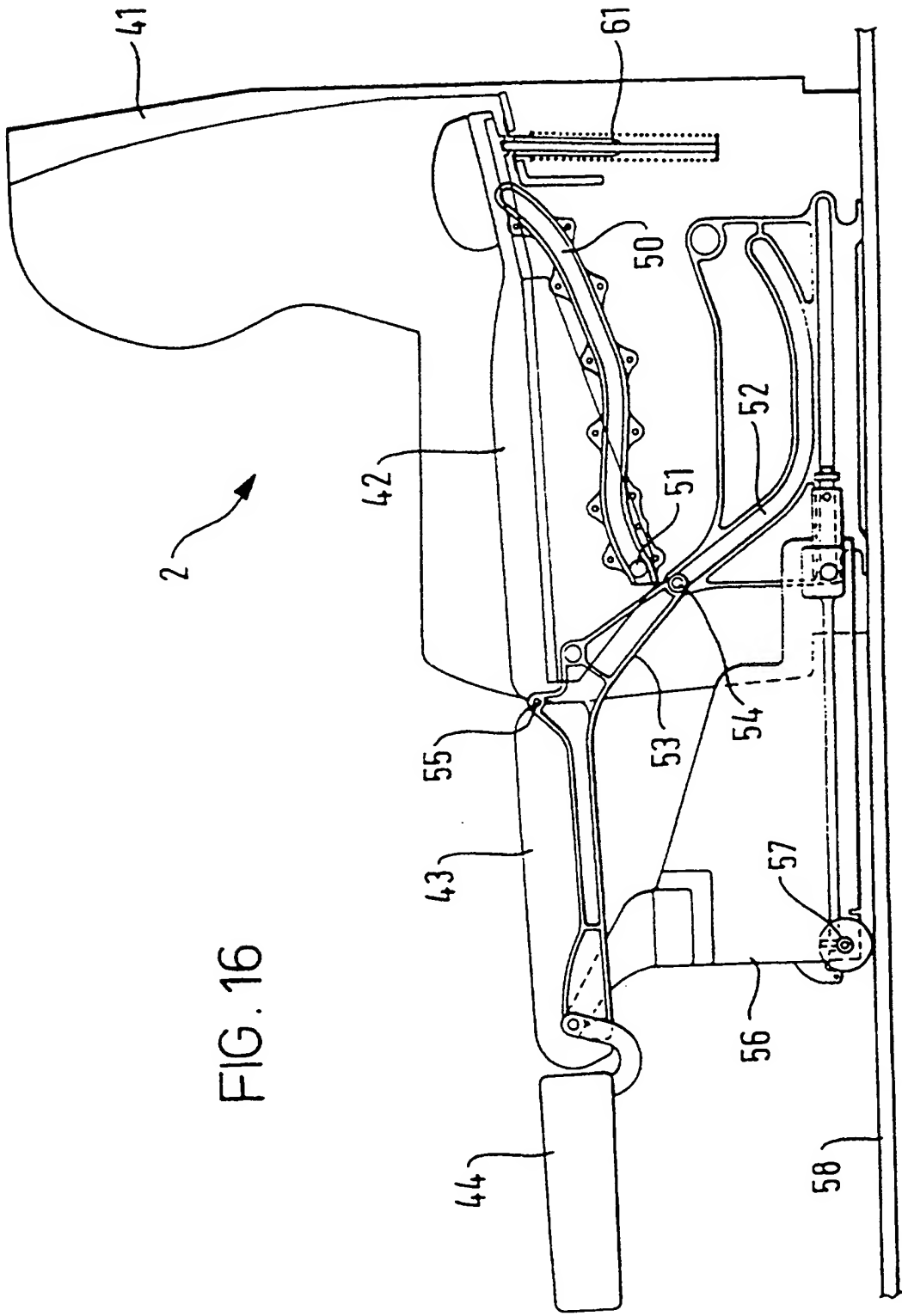


FIG. 16

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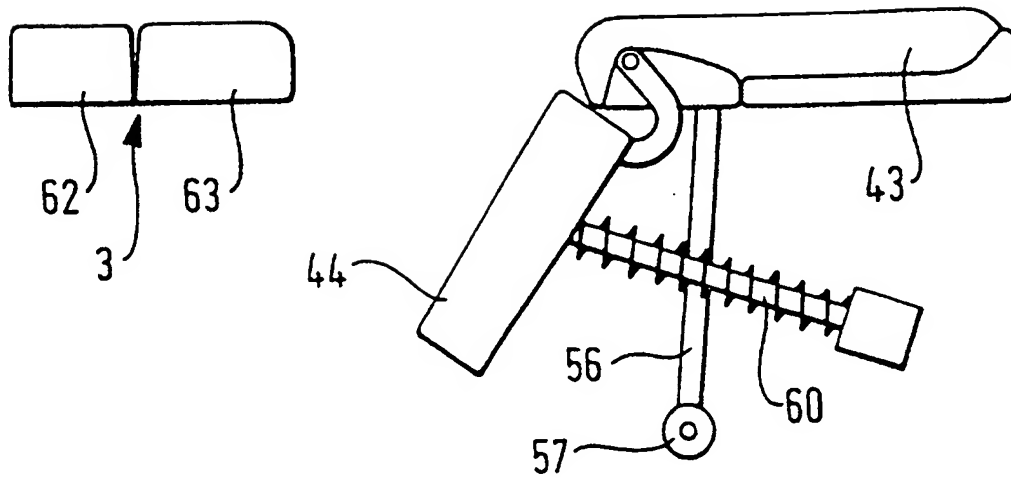


FIG. 17

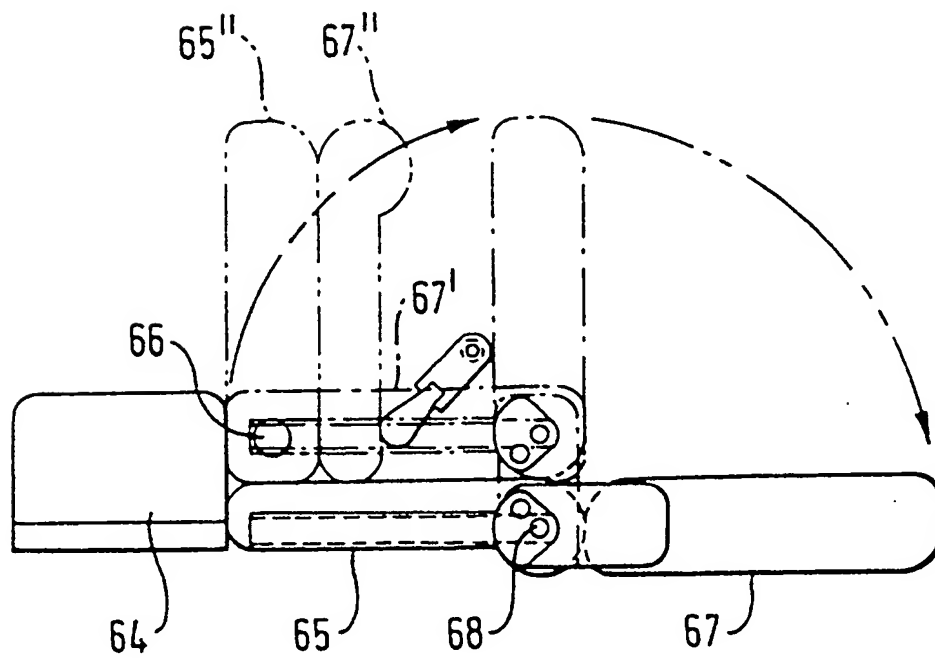


FIG. 18

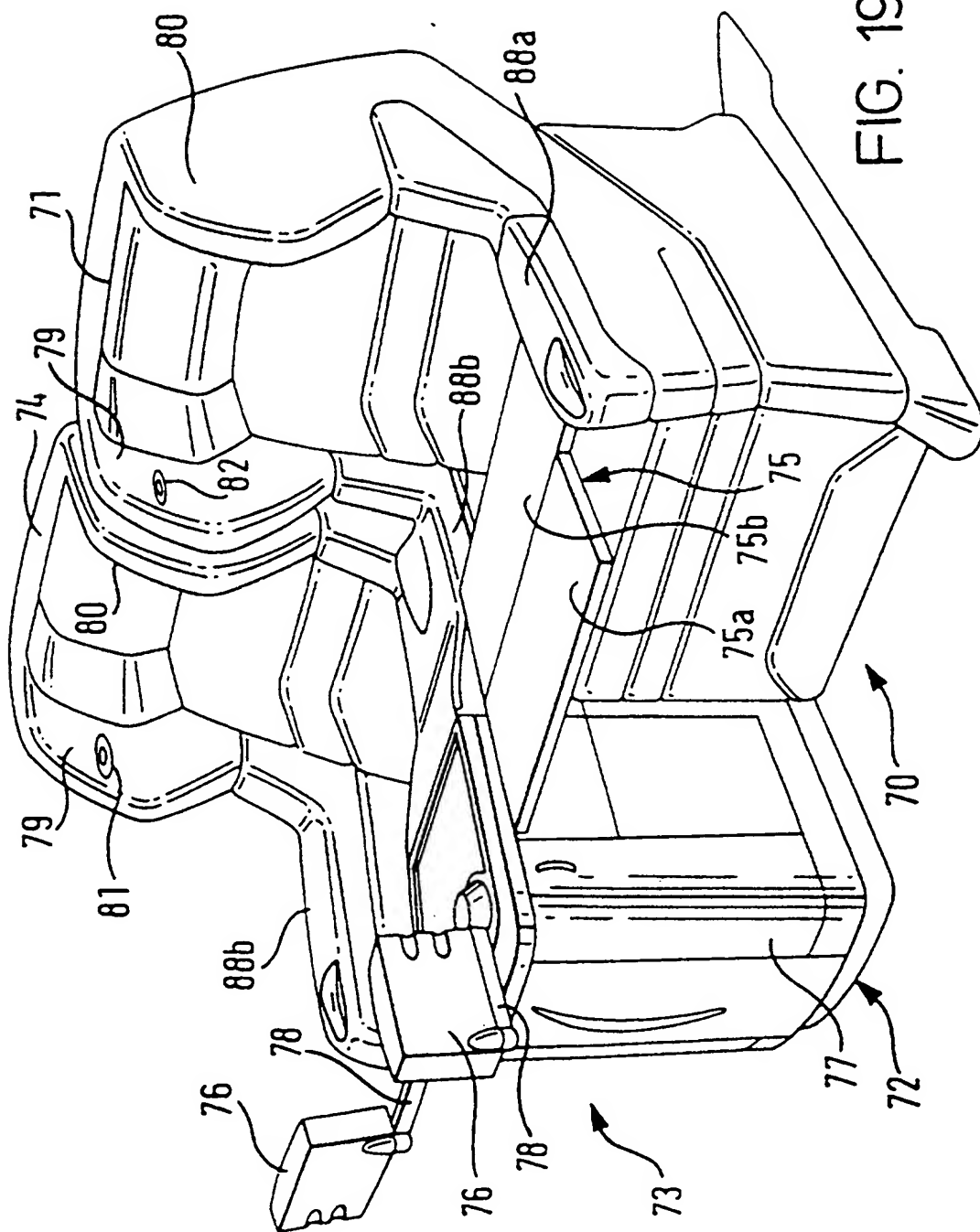


FIG. 19

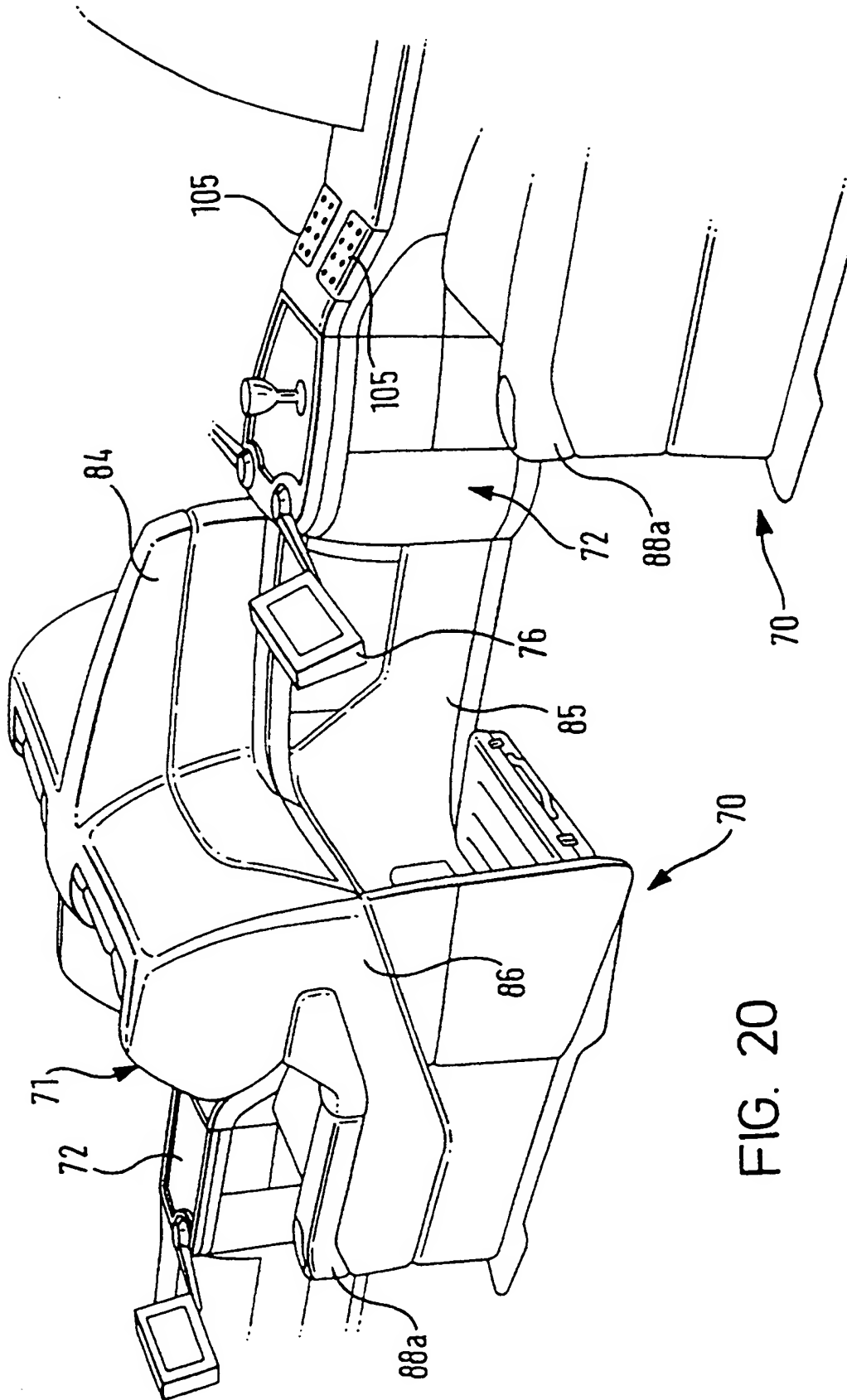


FIG. 20

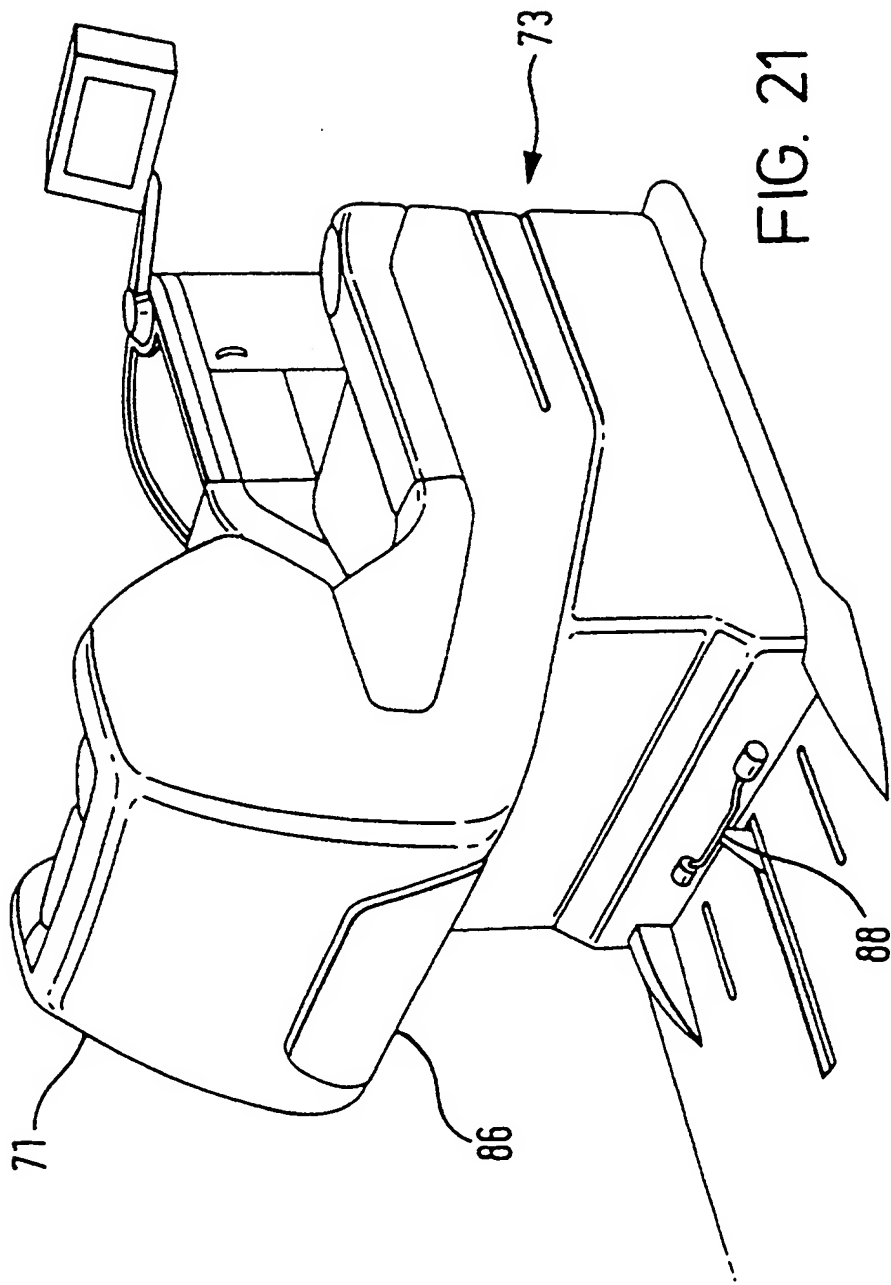


FIG. 21

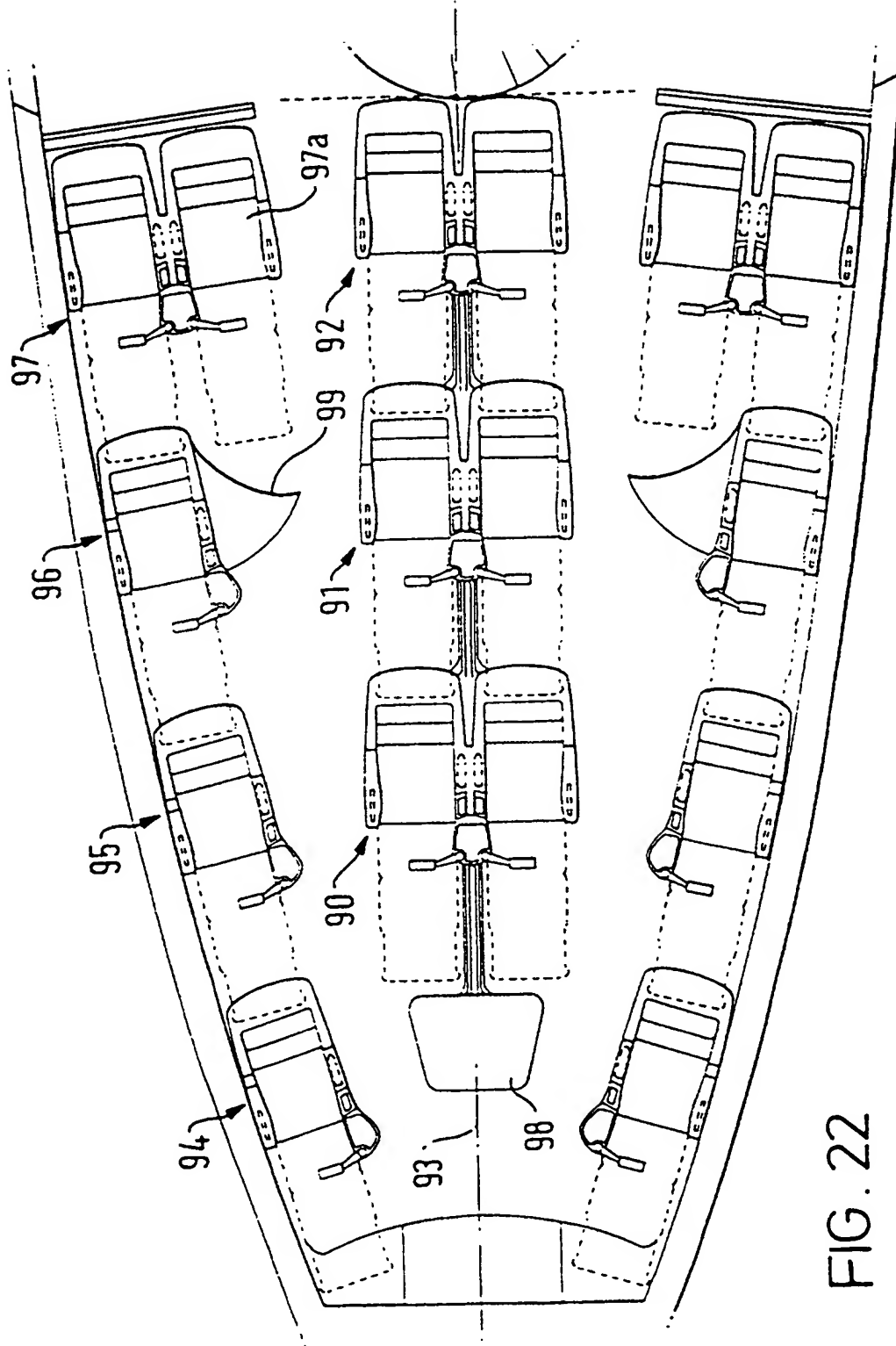


FIG. 22

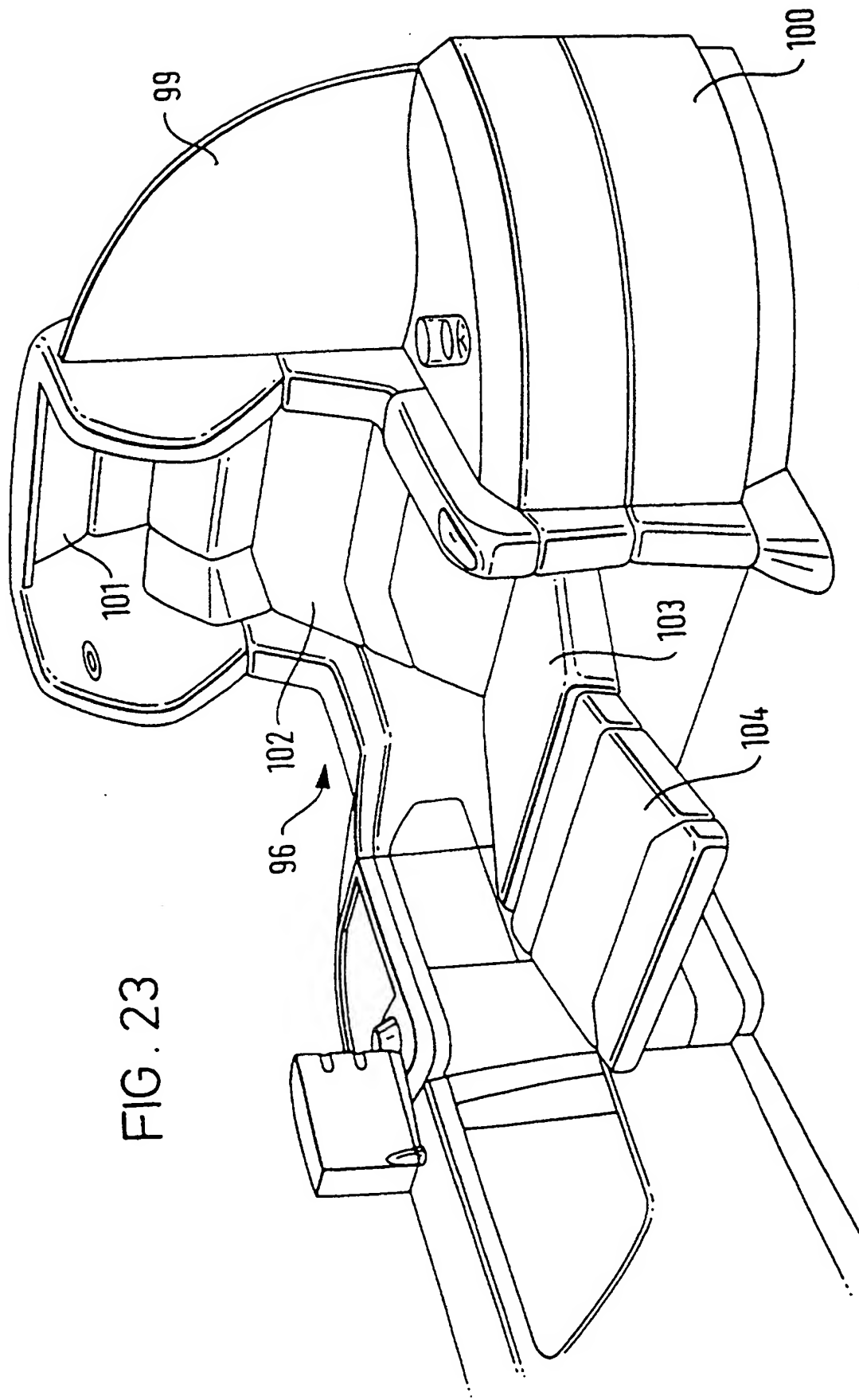


FIG. 23

FIG. 24

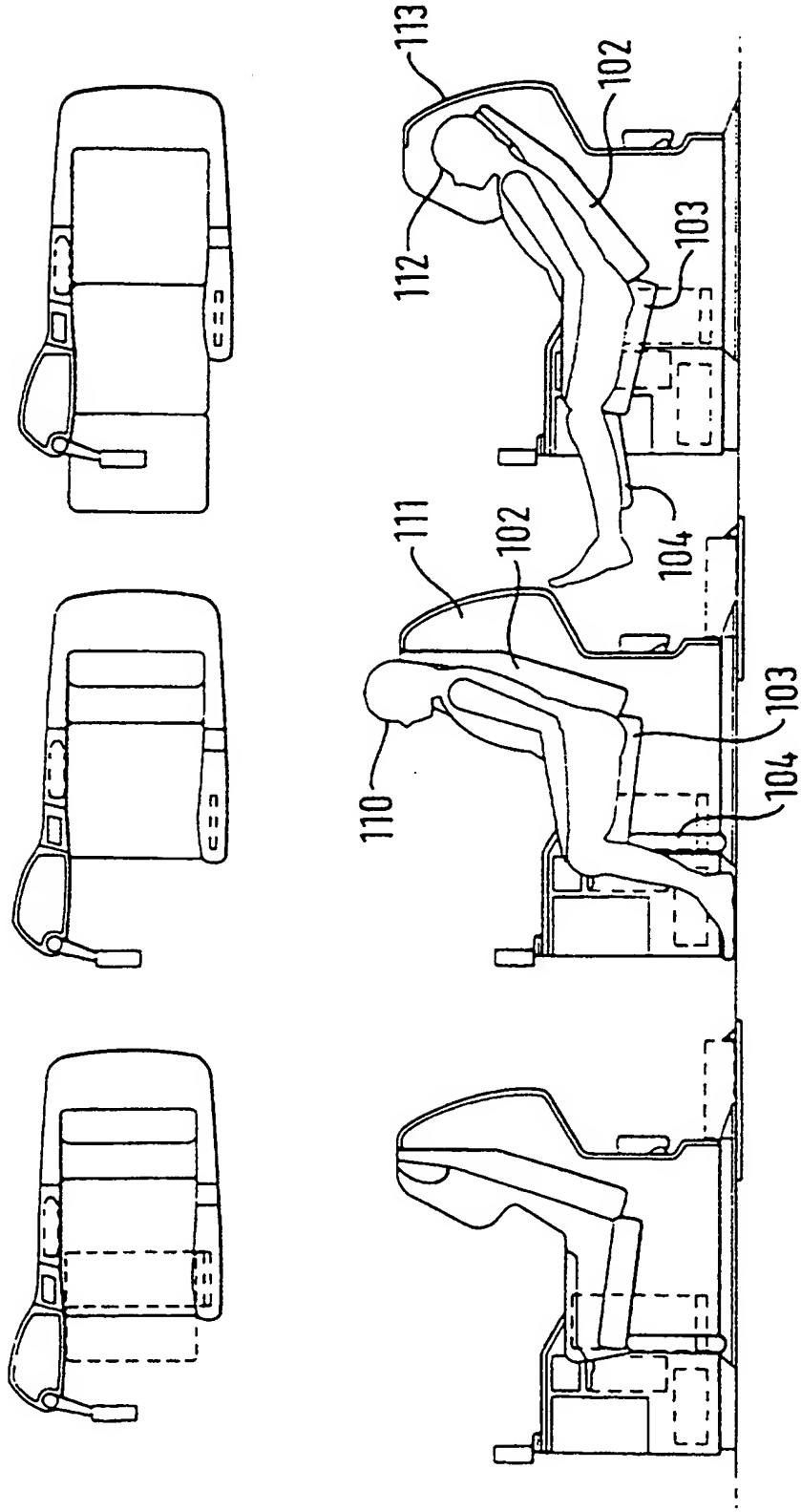
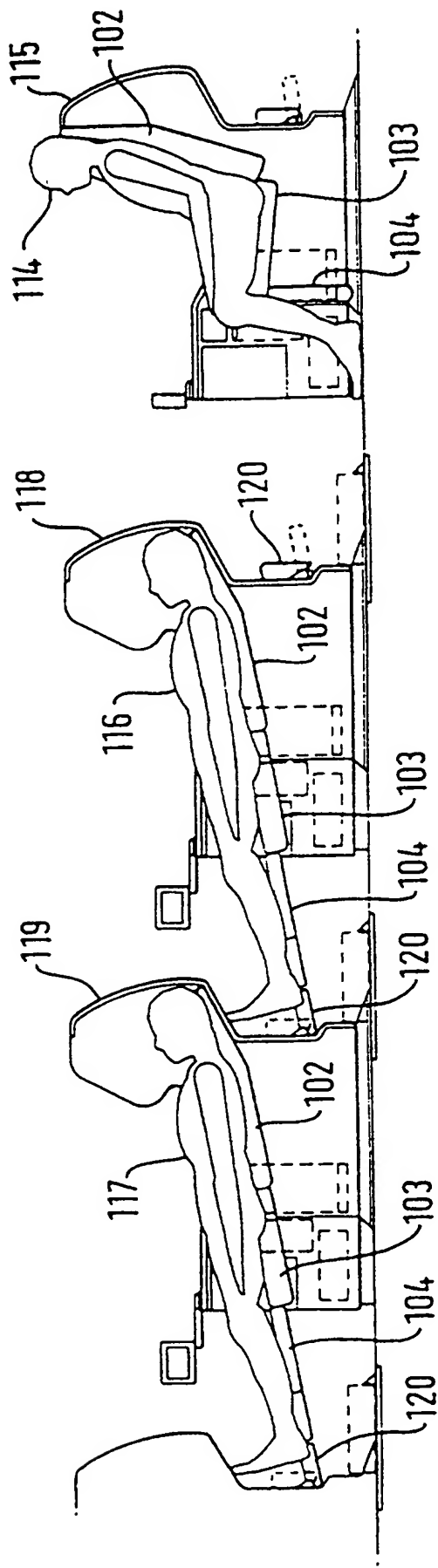
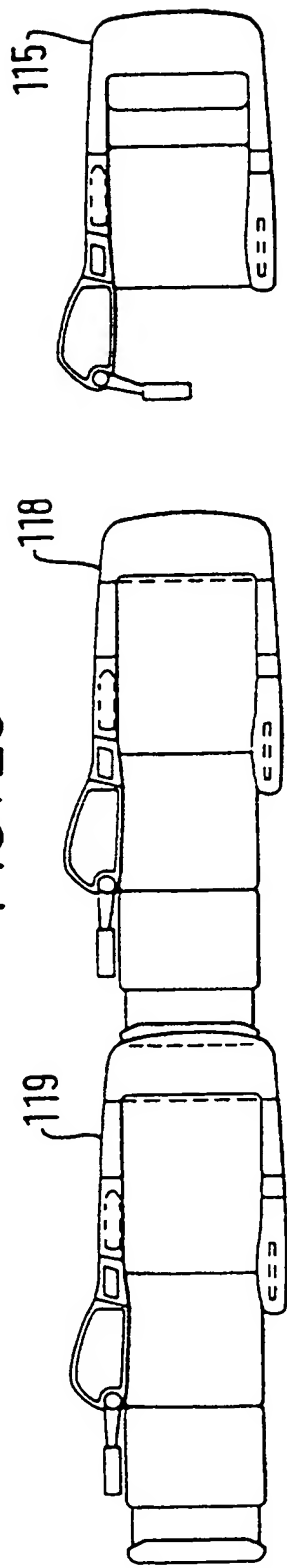


FIG. 25



A SEATING UNIT

The invention relates to a seating unit. More specifically the invention relates to a seating unit for an aircraft cabin.

5 In most aircraft the first class cabin is fitted with large, widely spaced apart seats in order to provide passengers with space and comfort during their journey. Presently, virtually every first class cabin is fitted with large double seats with a pitch (longitudinal distance between seats) of at least 1500mm.

10 The present seat design suffers from several disadvantages. The seats are not designed to lie flat, and this makes sleeping uncomfortable. There is also a lack of privacy between the two seats. This can be very disconcerting for passengers, particularly when sleeping. Passengers have said that the sensation is akin to being in bed with a stranger. It would of course be possible to design these seats to lie flat. However, this creates another a problem relating to the manner in which the seats recline. Where a seat is reclined its back tilts into the accommodation space of the passenger behind. This is psychologically
15 unpleasant for passengers who feel that their living space is being violated. It also makes it difficult for passengers behind a reclined seat to leave their own seats without disturbing other passengers. This is especially difficult for passengers occupying a window seat, who will disturb both passengers in the reclined seats in front and the passenger in the aisle seat next to him when he
20 leaves his seat. One way of overcoming this problem would of course be to

increase the pitch between seats up to say 2 metres. This is undesirable because, clearly, it reduces the seating capacity within the cabin for the sake of only one, relatively minor advantage.

Furthermore, the design of existing first class seating does not lend itself
5 to providing individual storage space for each passenger. Passengers prefer to keep personal belongings within reach and presently this is only possible if bags, pillows, newspapers etc. are placed on the floor of the cabin. Consequently, the cabin can become very untidy during a flight, particularly if it is long overnight flight.

10 The present invention aims to overcome or at least reduce the above discussed problems.

According to one aspect of the invention there is provided a seating unit comprising a fixed housing containing a primary seat with a reclinable back, wherein the back is arranged to recline in such a manner that it remains within
15 the housing.

According to another aspect of the invention there is provided an accommodation unit comprising a reclinable principle seat comprising a back and a seating portion, and an opposing secondary seat; the principle seat being movable to a reclined position at which the back and seating portion together
20 with the secondary seat form a substantially flat sleeping surface.

According to another aspect of the invention there is provided a seat comprising a back portion, a seating portion and a trolley associated with the seating portion, the trolley being drivable to move the seating portion between a retracted position and an extended position, the seating portion and the back
5 portion cooperating such that as the seating portion is moved between the retracted and extended positions the back portion is caused to move between substantially upright and reclined positions.

The invention also provides a seating unit for a vehicle. the unit comprising a primary seat and a utilities unit adjacent to and structurally separate
10 from the primary seat for housing utilities for individual use by an occupant of the primary seat.

In the seating units to be described herein. each unit comprises a principal seat whose purpose is to provide support for a passenger sitting thereon. Utilities, i.e. ancillary features, such as a table, a television screen and
15 storage are provided by a separate utilities unit or sideboard which together with the principal seat forms the seating unit. Thus, during a flight the use by a passenger of his utilities does not disrupt other passengers because such use is substantially contained within the domain of that passenger's seating unit.

In the following there will be described a reclining seat in which a leg
20 support panel is cantilevered out from the front of the seat as the seat is reclined

by a scissor-type cantilever arrangement. Such a scissor-type arrangement is used extensively in aircraft seats.

According to a further aspect of the invention there is provided an aircraft including a cabin comprising a plurality of seating units as
5 aforementioned.

Hitherto, the seats in an aircraft cabin have been arranged uniformly in a configuration in which rows of seats are positioned perpendicularly to the axis of the aircraft. Generally, each row of seats is spaced a fixed distance from the row in front so that each passenger has the same amount of space. The even spacing
10 also enables the back of one seat to support a table and provide storage space, and in some cases even house a television screen and other ancillaries and utilities, for the occupant in the seat behind. The use of the rear of one seat to support utilities for the seat behind is an undesirable compromise which results in the actions of one passenger causing disruption to other passengers during a
15 flight.

The invention also provides a vehicle comprising a cabin having a major axis and being defined by at least two walls one to each side of the major axis, the cabin containing a plurality of accommodation units each having a respective major axis and being suitable for use by an individual passenger, wherein at least
20 some of the units are so staggered along a line at each wall as to define an arrangement in which the major axis of each said unit along the line is out of

alignment with the major axis of the cabin, thereby providing privacy to each passenger in said units along the line by avoiding any of said units being entirely adjacent any other of said units.

5 It will be apparent from consideration of the description that follows hereinafter that a staggered configuration enables each passenger to be provided with a greater degree of privacy. Such an arrangement enables screens to be placed between adjacent seating units to define the extent of each passenger's domain. A staggered configuration can also enable more seats to be provided within the same cabin space without any perceived loss of individual passenger
10 space.

The above and further features of the invention are set forth with particularity in the appended claims and together with advantages thereof will become clearer from consideration of the following detailed description of an exemplary embodiment of the invention given with reference to the
15 accompanying drawings.

In the drawings:

Figure 1 is a first perspective view of a first accommodation unit embodying the invention;

Figure 2 is a second perspective view of the first accommodation unit;

20 Figure 3 is a plan view of an aircraft cabin containing plural accommodation units in an outboard-facing configuration;

Figure 4 is a plan view of an aircraft cabin containing plural accommodation units in an inboard-facing configuration;

Figure 5 is a perspective view of a second accommodation unit embodying the invention for use in the outboard-facing configuration of Figure 3;

Figure 6 is the second perspective view of the second accommodation unit;

Figure 7 is a first perspective view of a third accommodation unit embodying the invention for use in the inboard-facing configuration of Figure 4;

Figure 8 is a second perspective view of the third accommodation unit;

Figure 9 is a first schematic sectional view of a seat;

Figure 10 is a second schematic sectional view of a seat;

Figure 11 is a third schematic sectional view of a seat;

Figure 12 is a third perspective view of the second accommodation unit;

Figure 13 is a third perspective view of the third accommodation unit;

Figure 14 is a first schematic sectional view of a seat;

Figure 15 is a second schematic sectional view of the seat of Figure 14;

Figure 16 is a third schematic sectional view of the seat of Figure 14;

Figure 17 is a fourth schematic sectional view of the seat of Figure 14;

Figure 18 is a schematic sectional view of an alternative secondary seat arrangement;

Figure 19 is a first perspective view of a fourth accommodation unit embodying the invention;

Figure 20 is a second perspective view of the fourth accommodation unit;

5 Figure 21 is a first perspective view of a fifth accommodation unit embodying the invention;

Figure 22 is a plan view of an aircraft cabin containing plural accommodation units;

Figure 23 is a second perspective view of the fifth accommodation unit;

10 Figure 24 shows side views and plan views of accommodation units in sitting and reclined positions; and

Figure 25 shows side views and plan views of accommodation units in sitting and sleeping positions.

Referring now to Figure 1 of the accompanying drawings there is shown
15 an accommodation unit, or seating unit 1 comprising a primary, reclinable seat 2 and a secondary, fixed seat 3. Both seats 2, 3 of the seating unit 1 are provided for use by a single first class passenger. It is, of course, entirely up to the passenger how he uses the seats 2, 3 but it is envisaged that he will make use of the primary seat 2 himself during the journey and use the secondary seat 3 for
20 other passengers who he invites to join him during the journey.

A second unit 4 comprising its own primary seat 5 and secondary seat 6 may be placed next to the first unit 1. In such a situation, the first unit 1 and the second unit 4 are separated from each other by a dividing wall 7 which provides privacy between the two units 1, 4. To this end, the dividing wall 7 comprises a
5 screen 8 between the primary seats 2, 5 of the two units and a screen 9 between the secondary seats 3, 6. A further screen wall 10 extends behind the two secondary seats 3, 6 to provide further privacy.

The two units 1, 4 shown in Figure 1 are designed to be placed in the centre of the cabin and offered to a couple who are travelling together. For this
10 reason, the two screens 8, 9 are modestly dimensioned and do not prevent passengers sitting in the two units 1, 4 from conversing with each other. Conveniently, a retractable screen (not shown) may be provided in either or both the screens 8, 9 for extension above the dividing wall to separate the two units 1, 4 entirely from each other when the passengers are not travelling together.

15 The space between the primary seat 2 and the secondary seat 3 of each unit is large, and indeed is sufficient for a table usefully to be placed between the two seats 2, 3. The dividing wall 7 includes a table storing portion 11. As shown in Figure 2, a table 12 housed in the storing portion 11 may be placed between the primary seat 2 and the secondary seat 3 during a flight should the passenger
20 so wish.

A flat area or counter top 13 between the secondary seat 2 and the screen 10 can be used by the passenger to store his briefcase, newspapers or other personal effects should he so wish. Conveniently, a television screen (not shown) may be provided hinged below the surface 13, or indeed within the dividing wall 7.

A greater degree of privacy may be achieved by staggering or overlapping the seating units. One way in which the seating units may be staggered is shown in Figure 3 of the accompanying drawings. In this arrangement plural seating units 15 are provided around the edge of a cabin 16. Each of the units 15 comprises a primary seat 17 and a secondary seat 18. When a passenger sits in the primary seat 17 of any of the units 15 he faces towards the outside of the aircraft. For the sake of convenience this overlapping configuration will be referred to herein as an outboard-facing arrangement. It should be noted that two pairs of units 1, 4 and 1', 4' are provided along the centre line 19 of the cabin. These units 1, 4 and 1', 4' are similar to the units shown in Figures 1 and 2, but it will be noted that there is a greater spacing between the units 1' and 4' than there is between the units 1 and 4. The amount of spacing between the units may be selected depending on the space available within the cabin and in anticipation of passengers preferences.

Another way in which seating units may be staggered is shown in Figure 4 of the accompanying drawings. Again, plural seating units 21 are provided

around the edge of the cabin 16, each seating unit 21 comprising a primary seat 22 and a secondary seat 23. When a passenger sits in the primary seat 22 of any of the seating units 21 he will face towards the inside of the aircraft cabin. For the sake of convenience this overlapping configuration will be referred to herein as an inboard-facing arrangement. Like the arrangement shown at Figure 3, pairs of units 1, 4 and 1', 4' are also provided along the centre line 19 of the cabin.

These staggered arrangements both make efficient use of cabin space to the extent that the same number of passengers can be accommodated in the cabin 16 as is possible to accommodate using the previously known double-seating arrangement with the larger 2 metre spacing. The choice of whether to use an inboard-facing arrangement or an outboard-facing arrangement is arbitrary because there are no significant cost advantages to either arrangement over the other arrangement. Preliminary research has shown that the outboard-facing arrangement is likely to be preferred by passengers because it provides a greater sensation of privacy than does the inboard-facing arrangement. With the outboard-facing arrangement passengers must turn around bodily to see other passengers in the cabin, whereas with the inboard-facing arrangement passengers are already facing inwardly towards other passengers.

The design of the seating units differs slightly depending on whether the seating unit is for a central position or is for an edge position in an inboard-facing arrangement or an edge position in an out-board-facing arrangement.

Figures 5 and 6 each show perspective views of two of the seating units designed for use in the outboard-facing arrangement of Figure 3. It should be noted that whilst the general design of each seating unit 15 is substantially the same of that of the above described seating unit 1, insofar as the primary seats 17 and the secondary seat 18 are positioned spaced apart and facing each other, many details of the design are different.

Extending between one side of the primary 17 and secondary 18 seats is a wall 24. A counter top 25 extends from the wall 24 to the inner wall of the cabin (not shown) and provides a surface for the passenger to place his personal belongings should he so wish. Further storage space may of course also be provided within the wall 24 if so required. A screen 26 extends from behind the primary seat 17 across the counter top 25. The screen 26 defines a boundary between consecutive seating units 15, providing privacy from other passengers. As shown in Figure 6, a table 27 may be provided within the counter top 25 behind an access slot 28.

Figures 7 and 8 each show a perspective view of a seating unit 21 suitable for the use in the in-board-facing configuration of Figure 4. The basic design of the seating unit 21 is substantially the same as the above described seating units 1 and 15, insofar as the unit 21 comprises spaced apart primary 22 and secondary 23 seats facing each other, but again several details of the design differ from that of the above described units 1 and 15.

A wall 29 extends along one side of the primary seat 22 and secondary seat 23 and a counter top 30 extends from the top of the wall to the cabin wall 31. A slot 32 provided in the counter top 30 contains a table 33 which may be slidably or pivotally mounted such that it can be pulled out by a passenger and positioned between the primary 22 and secondary 23 seats as shown in Figure 8. Consecutive seating units 21 are separated from each other by a privacy screen 34. A further structure comprising a wall 35 and surface 36 is provided between the screen 34 and the primary seat 22 for use by the passenger. Cupboards or other storage space (not shown) may be provided in the wall 29 and/or the wall 35.

As shown, the wall 29 does not extend alongside the primary seat 22. Instead a portion is omitted to enable the passenger to use the space under the counter top 30 for storing personal baggage. The primary seat 22 (and indeed the primary seats 2 or 17) may be secured pivotally within the seating unit 21 to enable the seat to be pivoted to a forward facing position (if necessary to satisfy regulations regarding take-off and landing). In this case, the omission of a portion of the wall 29 would enable the seat 22 to be pivoted to a position at which the passengers legs are placed under the counter top 30.

The primary seats 2, 17 and 22 are reclinable. Figures 9, 10 and 11 of the accompanying drawings show in schematic form how one of the primary seats, say primary seat 2, can be continuously reclined between an upright position

(Figure 9) and a substantially horizontal position (Figure 11). The primary seat 2 comprises a fixed housing 41 which houses a seat back portion 42, a seating portion 43, and a leg rest 44. During a flight the seat 2 can be reclined to a position (shown in Figure 10) in which the passenger (not shown) is laid back in the seat with his back supported by the back portion 42 and his legs supported by the leg support 44.

Should the passenger wish to sleep, the seat portion 43 and leg rest 44 can be moved out of the housing 41 until the leg rest 44 meets the seating portion 45 of the secondary seat 3. In this position, the back portion 42 lies substantially flat in the housing 41. Thus, the back portion 42, the seating portion 43 and the leg rest 44 of the primary seat, together with the seating portion 45 of the secondary seat form a substantially flat surface upon which the passenger may sleep. The reclining mechanism of the primary seat is represented schematically by crossed lines 46, 47 in the drawings because the design of such a mechanism is *per se* well known it requires no further explanation herein. The reclining mechanism may be operated manually or automatically by way of electric motors, etc. (not shown).

It should be noted that the primary seat is arranged so that the back portion 42 always remains within the housing 41 and thus does not impinge on the accommodation space of the other passengers behind.

Figure 12 is a perspective view of the outboard-facing seating unit 15 with the primary seat fully reclined so that its back portion 42, seat portion 43 and leg rest 44 form a horizontal sleeping surface. The drawing also shows the housing 48 of another seating unit. In the back of the housing doors 49 and 50 provide access to a cupboard or wardrobe space 51 and a lower door 52 provides access to further storage space 53.

Figure 13 similarly shows an inboard-facing unit 21 in which the back portion 42, seating portion 43 and leg rest 44 of the primary seat 22 have been fully reclined to form, together with the seating portion 45 of the secondary seats 23, a substantially flat, horizontal sleeping surface.

Turning now to Figures 14 to 17 of the accompanying drawings there are shown a primary seat 2 within a fixed structure or housing 41 which houses a back portion 42, a seating portion 43, and a leg rest 44.

Figure 14 shows the seat 2 in a retracted position in which the back portion is substantially fully upright. The seat includes a reclining mechanism comprising a back runner 50 to which the back portion 42 is connected at a support point 51. The reclining mechanism further comprises a seating runner 52 to which the seating portion 43 is connected via a guide member 53 at a support point 54. The seating portion 43 is connected at a pivot point 55 to one end of the back portion 42 and is supported by a trolley member 56 having wheels 57 that roll over the floor 58 of the cabin. Tracks (not shown) may be

provided on the floor 58 to prevent excessive wear of the floor and facilitate smooth movement of the seat. It will be appreciated that runners and tracks are provided on both sides of the seat for balanced support of the various parts of the seat.

5 The seat is driven by electric motors (not shown) controlled by way of a control panel (not shown). When a passenger selects "recline" on the control panel a motor causes the seating portion 43 to be driven forward, by way of rotation of a screw shaft 59, out of the housing 41 to an extended position in which the back portion is in a reclined position such as shown in Figure 15. The
10 driving forward of the seating portion 43 causes the back portion 42 to be guided along a path defined by the back runner 50. The form of the runners 50 and 52 is selected in relation to the height of the trolley member 56 to guide the orientation of the seating portion 43 so that it remains comfortably inclined to the horizontal while the steepness of the back portion 42 is reduced.

15 As the seating portion continues to be driven beyond the reclined position shown in Figure 15 toward the extended position shown in Figure 16 a second motor (not shown) is actuated independently of the driving of the trolley to drive a screw arrangement 60 and thereby cause the leg rest portion 44 to
20 move out of the substantially upright or vertical position shown in Figures 14 and 15 toward the substantially horizontal or reclined position shown in Figure 16. A damper 61 may be provided at the rear of the housing 41 to provide

support for the free end of the back portion 42 as the seat moves toward and comes to rest in the flat surface position of Figure 16.

In order to avoid the possibility of a passenger's feet becoming trapped between the leg rest 44 and the secondary seat 3 during the transition of the leg rest 44 from the vertical to the horizontal, the secondary seat 3 may comprise a
5 fixed rear seat portion 62. and a front seat portion 63 pivotally connected to the rear portion 62 as shown in Figure 17 of the accompanying drawings. In the event that a passenger places his feet, or indeed any other object, between the leg rest 44 and the secondary seat 3, the front portion 63 will pivot up out of the way
10 of the object. If a passenger does not wish to make use of the secondary seat 3, the front portion 63 may be pivoted to a position over the rear portion 62 to provide more usable floor space for the passenger within his seating unit.

In steady flight the main axis of an aircraft is inclined to the horizontal. Typically an aircraft flies at a pitch of 3° , i.e. with its nose pointing slightly
15 upward. If the seating unit were designed to recline to form a substantially flat sleeping surface at a position which is horizontal to the plane of the aircraft, then a passenger would be caused to lie in a position where his head is lower than his feet when the aircraft is flying at its normal 3° pitch. Such a position is undesirable not least because passengers find it uncomfortable. In order to avoid
20 the passenger problems with such a position, the reclining mechanism is designed to define a flat sleeping surface which is inclined slightly by, say 3° , so

that relative to the plane of the aircraft the passenger lies in a position where his head is higher than his feet. As a result in normal steady flight the passengers head will lie in the same horizontal plan as his feet. Conveniently, placing the sleeping surface at a slight incline enables the arm rests etc. in the housing more easily to be designed to provide extra clearance for the passenger's shoulders while he is lying down.

Figure 18 shows an alternative secondary seat arrangement. a so-called bi-fold arrangement. The secondary seat comprises a fixed seat portion 64, a rear seat portion 65 pivotally connected at a join 66 to the fixed seat portion 64 and a front seat portion 67 pivotally fixed to the rear seat portion 65 at a join 68.

The secondary seat can be moved between a fully extended position in which the front and rear seat portions are in the positions represented by the references 65 and 67, a partially extended position in which the front portion is pivoted about the join 68 to rest on top of the rear portion as represented by the references 65 and 67', and a stowing position in which the rear portion is pivoted about join 66 to place the front and rear portions in the positions represented by the references 65" and 67".

Figure 19 shows a seating unit 70 comprising a reclinable seat 71 and a sideboard or utilities unit 72. A second seating unit 73, placed next to the seating unit 70 and comprising a reclinable seat 74, has its own utilities in the utilities unit 72. Although not shown in the drawings, the two units 70, 73 may

be separated from each other by a dividing wall to provide privacy between the two units. The two units 70, 73 shown in Figure 19 are designed to be placed in the centre of the cabin and offered to two passengers travelling together. The utilities unit 72 contains for each seating unit 70, 73 a table 75, a TV-type monitor 76 and a cupboard 77, and usefully defines flat surfaces for smaller objects such as tea cups and the like. The cupboard 77 may be used by a passenger to store personal items such as a wash bag, headphones etc. and space may be provided for storing magazines, newspapers and the like. Conveniently, a life vest can be stored in the utilities unit 72.

As shown in Figure 19 the table 75 comprises two parts 75a and 75b hinged together, the outermost part being pivotally mounted in the utilities unit in a "lift and drop" arrangement. That is to say, the two parts 75a, 75b of the table may be folded together and then rotated up to drop vertically into a storage space below a cover (now shown) in the utilities unit 72. When the table is again needed it can be lifted out of the storage area, rotated into the horizontal position, and the two parts unfolded ready for use. Any of the other well known table storage arrangements use in aircraft may, of course, be used instead of the "lift and drop" arrangement if so desired.

The TV-type monitor 76 is shown mounted to a pivotal arm 78 on the utilities unit 72. The monitor 76 provides in-flight entertainment for the passenger and need not be mounted as shown. Alternative arrangements where

the monitor 76 retracts into the utilities unit 72 or where the monitor 76 is removably secured to the unit 72 for example may instead be employed.

The use of a sideboard or utilities unit 72 enables a large number of ancillary features to be deployed off-seat. Removing the table and monitor
5 entirely from the seat reduces the stress in the seat by removing the load of those utilities. The seat and utilities unit thus cooperate to provide a seating unit that offers a comfortable and useful travelling environment for passengers.

The seating unit 70 comprises a pair of shields 79, 80 at approximately head height for a passenger sitting upright in the seat. The shields 79, 80
10 increase the perception of privacy for the seat's occupant. Lights 81, 82 may be provided in the shields for use by the passenger if desired.

Figure 20 of the accompanying drawings illustrates how several pairs of seating units may be arranged along the centre of a cabin. Each passenger's area is defined by the seat 71 itself, the utilities unit 72, the back of seating unit 83 in
15 the front, and screens 84, 85 extending from behind the seating units 83 in front of the utilities unit 72. For reasons that will become clear from the description that follows hereinafter the upper part of each seat defines an overhang 86 to the rear of the seating unit. Space below the overhang 86 may be left open as shown in Figure 20 or may be partly enclosed to provide in both cases a briefcase (or
20 similar) storage area for the passenger in the seat behind. A spring loaded clamp 88 may be provided to secure briefcases and the like placed in the storage area.

Other storage space for such items as a life vest may be provided in the arms 88a, 88b of the seat.

While the overlapping arrangement shown in Figures 3 and 4 is preferred, other seating arrangements may, of course, be employed. Figure 22 of the accompanying drawings shows an arrangement in which a central series of seats comprising pairs of units 90, 91, 92 is spaced along the central axis 93 of the cabin, and three individual units 94, 95, 96 and a single pair of units 97 are placed along each side of the cabin. A storage unit 98 is placed in front of the foremost central pair of units 90 for privacy. Similarly, a screen 99 is placed in front of the side pair of units 97 and beside the single seat 96 to provide privacy especially for the occupant of the seat 97a. The screen 99, which can be seen more clearly in Figure 23, is placed behind a side console 100 beside the single seat 96 and is secured to the back of the shield 80 of that seat. More storage space may be provided in the side console 100 if desired.

It can be seen from Figure 23 that the seat 96 is reclinable in a similar manner to the way in which the seating units shown in Figures 1 to 17 herein can recline. Like the previously described seats, the seat 96 comprises a fixed structure or housing 101 which houses a seat back portion 102, a seating portion 103 and a leg rest 104. Reclining of the seat is controlled by the occupant by way of a control panel 105 (see Figure 20 for example) which controls actuation

of motors and driving of shafts in a similar manner to that described hereinabove with reference to Figures 14 to 17.

The manner in which the seat 86 reclines can be seen clearly in Figures 24 and 25. In Figure 24 a passenger 110 is shown sitting upright in a seat 111 and another passenger 112 is shown in a reclined position in another seat 113. In Figure 25 a passenger 114 is shown sitting upright in a seat 115 and passengers 116, 117 are shown lying down in respective seats 118, 119.

As the seat 113 is reclined the back portion 102 moves into the housing 101. This is one reason why an overhang 86 is formed in the upper portion of the housing. As the back portion moves into the housing the seating portion 103 and leg rest 104 move forward out of the housing, the leg rest 104 moving up from the vertical to a more horizontal position. Continued reclining of the seat eventually results in the back portion 102, seating portion 103 and leg rest 104 arriving at the position of seats 118 and 119 in Figure 25. In this position the back portion 102, the seating portion 103 and the leg rest 104 together form a substantially flat sleeping surface inclined to the plane of the aircraft by a small angle. The angle is not critical, but the steeper the angle the less space that is required between seating units. Research has shown that an angle of more than about 8° from the horizontal is uncomfortable because passengers feel that they will slip forward. Bearing in mind that most aircraft are pitched at 3° this means that an angle of approximately 11° can be employed.

With the seat in the sleeping position shown in Figure 25 the feet of a tall passenger will reach into the space below the overhang of the seat in front. This is another reason for providing the overhang in each seating unit. The sleeping surface may be extended by providing on the seat in front a flip down extension unit 120 which cooperates (in a similar manner to the secondary seat in the embodiments shown in Figures 1 to 13 with the leg rest 104.

The seating unit designs shown in Figures 19 to 25 are aesthetically different than the designs of the seating units shown in Figures 11 to 13 but it will be appreciated from consideration of the foregoing that functionally the designs are very similar. Both designs provide desirable privacy for passengers.

Both designs provide a reclining/sleeping seat which does not infringe the domain of other passengers in seats in front or behind when the seat is moved to a reclining/ sleeping position. The use of screens can enhance further individual passenger's privacy. The provision of ancillaries in an off-seat arrangement as part of the seating unit reduces loading of the seat itself allowing more space within the seat to be given over to the passenger.

The seating unit designs shown in Figures 19 to 25 do not include a secondary seat and do not provide a substantially horizontal sleeping surface. Instead, a flip-down extension may be provided. Also, while the sleeping surface is flat, it is inclined at an angle to the horizontal. Both of the features

reduce the amount of space required for each seating unit within an aircraft cabin, thereby enabling more units to be fitted into a given cabin space.

While Figure 22 shows one arrangement of one design of seating units in an aircraft cabin, it will be appreciated that other designs may be placed in that arrangement, or other arrangements (such as the echelon arrangement) may be used with that design of seating unit. Features described in respect of one embodiment may, of course, be adapted for use in another embodiment, the selection of a given design and arrangement of features depending upon the type of aircraft in which the seating units are to be fitted, the nature of the flights and other factors well outside the ambit of the invention.

Having thus described the present invention by reference to preferred embodiments it is to be well understood that the embodiments in question are exemplary only and that modifications and variations such as will occur to those possessed of appropriate knowledge and skills may be made without departure from the spirit and scope of the invention as set forth in the appended claims and equivalent thereof.

CLAIMS:

1. A passenger accommodation unit for an aircraft, the accommodation unit comprising a primary seat and a secondary unit positioned in front of the primary seat which secondary unit includes a
5 surface, the primary seat comprising:

a back portion:

a support supporting said back portion to enable said back portion to recline continuously between and including a substantially upright position and a fully reclined position;

10 a seating portion;

a support supporting said seating portion and arranged to allow said seating portion to move forward as said back portion is reclined and to move backward as said back portion is moved toward said upright position; and

a leg support connected to move with said seating portion and
15 positionable between and including a retracted position and an extended position forward of said seating portion, and wherein

the primary seat and the secondary unit are so arranged relative to each other that with said back portion in said fully reclined position and said leg support in said extended position, said back portion, said seating portion, said
20 leg support and said surface together form a substantially flat and continuous sleeping surface.

2. The accommodation unit as claimed in claim 1, wherein said back portion can be reclined to a substantially horizontal position.

3. The accommodation unit as claimed in claim 1 or 2, wherein the secondary unit comprises a secondary seat positioned to face the primary seat.

4. The accommodation unit as claimed in any of claims 1 to 3, further comprising a privacy screen.

5. The accommodation unit as claimed in any of claims 1 to 4, further comprising a fixed housing containing the primary seat, wherein said back portion is reclinable in such a manner that it remains within said housing.

6. The accommodation unit as claimed in claim 5, wherein said housing comprises storage space provided behind said back portion of the primary seat.

7. The accommodation unit as claimed in any of claims 1 to 6, further comprising a retractable table.

8. The accommodation unit as claimed in any of claims 1 to 7, further comprising a trolley for supporting said seating portion, said trolley comprising a member extending away from the seating portion to contact a supporting surface on which in use the accommodation unit is placed and thereby to support the seating portion, the trolley being connected to driving means for driving the trolley to move said seating portion forward and

backward between a retracted position and an extended position, said seating portion and said back portion being connected such that as said seating portion is moved between said retracted and extended positions said back portion is caused to move between substantially upright and fully reclined positions.

9. The accommodation unit as claimed in claim 8, wherein said back portion is connected at one end thereof to said seating portion.

10. The accommodation unit as claimed in claim 8 or 9, further comprising back guiding means for guiding said back portion between said substantially upright and reclined positions.

11. The accommodation unit as claimed in any of claims 8 to 10, further comprising seat guiding means for guiding said seating portion to vary the orientation thereof as said seating portion is moved between said retracted and extended positions.

12. The accommodation unit as claimed in any of claims 8 to 11, wherein said leg support is connected to moving means for moving the leg support between said retracted and extended positions independently of the driving of said trolley.

13. The accommodation unit as claimed in any of claims 1 to 12, wherein the secondary unit is secured to the back of another seat.

14. The accommodation unit as claimed in any of claims 1 to 13, wherein the secondary unit comprises a secondary seat.

15. The accommodation unit as claimed in any of claims 1 to 14, wherein the secondary unit is pivotable to avoid trapping of an object between the secondary unit and said leg support as said leg support is moved between said retracted and extended positions.

5 16. The accommodation unit as claimed in claim 14 or 15, wherein said secondary seat comprises a fixed portion and a pivotable portion pivotable to avoid trapping of an object between the secondary unit and said leg support as said leg support is moved between said retracted and extended positions.

10 17. The accommodation unit as claimed in any of claims 8 to 16, wherein the driving means comprises an electric motor for driving said trolley.

18. The accommodation unit as claimed in claim 17, wherein the moving means comprises an electric motor for driving said leg support.

15 19. The accommodation unit as claimed in claim 18, further comprising user operable control means for controlling said electric motor.

20. The accommodation unit as claimed in any of claims 17 to 19, further comprising user operable control means for controlling said electric motor.

20 21. The accommodation unit as claimed in any of claims 1 to 20, further comprising a utilities unit adjacent to and structurally separate from

the primary seat for housing utilities for individual use by an occupant of the primary seat.

22. The accommodation unit as claimed in claim 21, wherein said utilities unit provides storage space for personal effects of the occupant.

5 23. The accommodation unit as claimed in claim 21 or 22, wherein said utilities unit contains a television-type monitor.

24. The accommodation unit as claimed in any of claims 21 to 23, wherein said utilities unit contains a table extendible in front of the primary seat.

10 25. The accommodation unit as claimed in any of claims 21 to 24, wherein said utilities unit is positioned to one side of the primary seat and the surface and extends between said surface and the primary seat.

26. An aircraft including a cabin comprising a plurality of accommodation units as claimed in any preceding claim.

15 27. An aircraft as claimed in claim 26, wherein the units are arranged in an outboard-facing configuration.

28. An aircraft as claimed in claim 26, wherein the units are arranged in an inboard-facing configuration.

20 29. An aircraft comprising a cabin containing a plurality of accommodation units as claimed in any of claims 1 to 25, wherein at least some of the units are arranged in an echelon.

30. An aircraft as claimed in claim 29, wherein the cabin contains along each side thereof a series of units arranged in an echelon.

31. An aircraft as claimed in claim 30, wherein the units along each side are oriented to face outwardly of the cabin.

5 32. An aircraft as claimed in claim 30, wherein the units along each side are oriented to face inwardly of the cabin.

33. An aircraft as claimed in any of claims 29 to 32, wherein the cabin contains a central series of units.



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Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
	NONE	

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